

# Contractors and Engineers Monthly

Vol. 42, No. 1

JANUARY, 1945

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## Covering the Field

### Rock Tunneling

The details of the contract for driving a 3,015-foot railroad tunnel through varied rock in the Montana mountains are covered in an article starting on this page.

### Airport Paving

High winds, blowing sand, and organizing for laying 190,000 cubic yards of concrete occupied the contractor for three runways, 10,000, 7,500, and 8,200 feet long, at the new New York City Municipal Airport at Idlewild, L. I., last autumn, in anticipation of speedy completion of the job in the spring. The story is on page 2.

### Black-Top Paving

Unusual weather and temperature conditions faced the contractor for asphalt resurfacing in northernmost California, described on page 2, while a story on a rock-asphalt paving contract on a suburban access highway near San Antonio, Texas, appears on page 26.

### Precast-Block Riprap

Contractors interested in the casting and placing of concrete-block riprap will find an article describing work on Buffalo Bayou near Houston, Texas, on page 6.

### Portraits in Print

On page 7 we start a series of interviews with successful contractors and engineers which will introduce these men to you, giving a picture not only of their business careers but of the personalities behind those careers, their interests and hobbies—in other words, showing that the men in construction are human too.

### County Road Work

The program of county road maintenance by town forces in Monroe County, N. Y., is outlined on page 8, while concrete patching of concrete roads in Wayne County, Mich., is described on page 61.

### Strip Mining

Many dirt-moving contractors are producing coal for the war effort by strip mining. The story of one such project is told on page 11.

### Maintaining Our Highways

Highway departments' biggest job at present is highway maintenance. Among the phases of this work described in this issue are Michigan's current maintenance by contract with counties and contractors as well as by state forces, on page 18, and economical oil-mat reconditioning of Montana's roads, on page 32.

### Detroit Expressway

An overall picture of the planning for design and construction of this outstanding "access-road" job in Detroit, Mich., appears on page 41.

(You will find "In This Issue" on page 2)

## Federal-Aid Road Bill Approved by Congress

Legislation Pending Since April, 1943. Passed by Both Houses: Provides an Annual Sum of \$500,000,000 for F-A Road Work in Three Post-War Years

After the many delays and discussions, the Senate and House have finally passed the Post-War Highway Bill which provides in its final form a total appropriation of \$1,673,250,000 for a three-year post-war highway program. Of this, \$1,500,000,000 is for Federal Aid, to be matched on a 50-50 basis, and \$173,250,000 is for highways in public lands.

The yearly Federal-Aid appropriation provides \$225,000,000 for projects on the Federal-Aid system; \$150,000,000 for projects on secondary and feeder roads; and \$125,000,000 for projects on the Federal-Aid system in urban areas. Annual authorizations for highway improvements in public lands are: \$25,000,000 for forest highways, \$12,500,000 for forest roads and trails, \$4,250,000 for roads and trails in national parks, \$10,000,000 for parkways to give access to national parks, and \$6,000,000 for Indian reservation roads.

In the matter of right-of-way costs, a compromise was reached in the final measure which provides that Federal funds may not be used to pay more than one-third of the costs of rights-of-way. (Concluded on page 21)

## New Railroad Tunnel 3,015 Feet in Length Driven in Montana

By FRANK B. SARLES,  
Western Field Editor

UNORTHODOX methods of tunnel excavation, necessitated by wartime shortages of the usual equipment, proved successful in the driving of a tunnel during 1944 for the Northern Pacific Railway near Bozeman, Mont., by the J. C. Boespflug Construction Co., of Seattle, Wash.

The new 3,015-foot tunnel, at an elevation of 5,562 feet above sea level, was driven with its center line 100 feet north of the old main-line railway tunnel built in 1886 with a clear width of only 16 feet and a 21-foot maximum height, and constituting one of the load-limiting factors in the railway's present operations. After a disastrous fire in 1896 had destroyed the original timbering, this old tunnel was lined at the sides with natural-cement concrete and with a brick crown. As the increasingly deteriorated lining could not be repaired under the heavy train movements of essential materials, a new tunnel was planned, with sufficient cross section for loads too large for the original tunnel in which the big Mallet locomotives now in use have only 2 feet 4 inches of top clearance, and with provision for proper

### Northern Pacific Project Aids Wartime Freight Haul; Equipment Substitutes; Rock Hauled Out by Trucks

smoke and heat removal.

A bad smoke condition in the old tunnel, aggravated by the fact that the high point in the grade occurs well within the tunnel, has made ventilation difficult. The new tunnel is built on a 0.6 per cent grade rising continuously to the west, which facilitates ventilation, and is well below the ruling grade which from Livingston west to the tunnel is 1.8 per cent, and from Bozeman east to the tunnel is 1.6 per cent.

The new tunnel will provide an 18-foot clear width inside the concrete lining to a point 15 feet above the top of the rail, from which point a 9-foot-radius semicircle forms the face line of the concrete top. The concrete lining will be 1 foot 6 inches thick in the rock section and, where bent-rail tunnel lining is used in the timber-lined section, the walls will be 2 feet thick. This allows a minimum of 1.0-foot thickness in front of the timber posts. The arch will be 1 foot 8 inches thick in the rock section and bent-rail-lining sections, and 2 feet 4½ inches thick, with a minimum of 1 foot 4½ inches, in front of the segments in the timber-lined section. Rock excavation was carried sufficiently outside the theoretical neat line of the concrete lining to permit correct setting of permanent timbering without its encroachment on the concrete lining, to be placed as a later part of this contract, and to extend out to the rock breakage line.

Train movements of wartime freight and passengers carried priority over all construction operations; no blasting was done either in the tunnel or the open excavation at the portals without telephonic clearance from the train dispatcher at Missoula through the Assistant Engineer's office; and an inspection of the old tunnel was made after each blast before trains were permitted to enter it.

Plans provide for grouting water-bearing rock seams and the insertion of 2 and 3-inch welded pipe to intercept this water and lead it through the tunnel lining into the roadside drainage flume provided as a part of the tunnel floor.

### Outside Plant

Preliminary work included building an office, repair shop, and compressor house at the top of the hill directly above the center of the tunnel; dams, pipe lines, pumps, and tanks for water supply; and blower houses for the ventilating equipment at each end of the bore.

(Continued on page 14)

HEY LOOK—AN EQUIPMENT DEALER! JUST LIKE HOME!



Mr. Oogi may not be able to get there, but the Associated Equipment Distributors anticipates a record attendance at its Twenty-Sixth Annual Meeting being held January 22-25 at the Edgewater Beach Hotel in Chicago. See page 36.



# Savin Starts Paving Of Concrete Runways At New York Airport

**Contract 7 for First Three Runways at City Airport To Be Completed in Spring; Wind and Sand Main Trials**

By THEODORE REED KENDALL,  
Editor

† CONTRACT 7 for the paving of concrete runways A, B, and C, 10,000, 7,500, and 8,200 feet long respectively, at the New York Municipal Airport at Idlewild, Long Island, (See C. & E. M., Nov., 1944, pg. 1) requiring 190,000 cubic yards of concrete, was awarded September 26, 1944, and actual paving got under way on October 25. This provided time for the contractor, A. I. Savin Construction Co., of East Hartford, Conn., to move in, set up, and lay a considerable yardage of concrete before 40-degree day temperatures required closing down for the winter.

When work starts again in the early spring, another complete paving outfit will be added so that the initial runways may be completed speedily for use by Army Transport Command planes returning casualties to the United States from the European Theatre of Operations and thus relieve the congestion at nearby LaGuardia Field.

The major obstacles to speed in the paving have been strong winds which carry fine sand to heights of 30 or 40 feet, from which the new concrete must be protected, and the necessity for leaving gaps in the paving for the later installation of electric conduits and drainage lines.

## Aggregate Handling

All aggregate and cement were delivered to the 4,057-acre site by truck from

local railroad sidings or docks. Crushed stone, produced at the Clinton Point Quarry of the New York Trap Rock Co., on the Hudson River near Poughkeepsie, was loaded onto barges which were towed to Flushing dock on Long Island, about 8 miles from Idlewild. From here the Colonial Sand & Stone Co., which has a contract with the A. I. Savin Construction Co. to furnish, batch, and haul all aggregate, sand, and cement, used a fleet of about nine diesel-powered Mack trucks to deliver the stone to stockpiles alongside the batching plant. Sand came from the Port Washington pit of the North Shore Sand & Gravel Co.

Both the Rosendale natural cement and Alpha portland cement were delivered in bulk by rail to Springfield Gardens, Long Island, a 2-mile haul to Idlewild. For the cement delivery the contractor constructed sand and cinder ramps with whitewashed timber sidings so that trucks could back up into the corrugated metal houses over the pits and dump their loads. Two Butler 250-barrel bulk-cement batching plants were set up in line so the batch trucks could run through and quickly receive the proper weight of each cement on each one of the five batches hauled per trip in the six to eight trucks serving the two pavers working this past autumn. Each truck had 75-cubic-foot capacity for batches, secured by building up the sides.

The sand and crushed stone were



C. & E. M. Photo

A. I. Savin Construction Co. experimented with several types of windbreaks to protect the concrete runway paving at the New York City Airport at Idlewild from blown sand.

stockpiled and then delivered to the Blaw-Knox three-compartment 90-yard batching plant with beam scales by a Northwest crane with a 57-foot boom handling a Hayward 15 $\frac{1}{2}$ -yard clamshell bucket. Because of the size of the job, the weight of the batching plant, and the sand subgrade, the contractor placed 2 feet of cinders over the entire plant area and poured 2-foot-thick concrete loading platforms under all batching and cement bins to furnish a reliable foundation for the plant as well as to provide a roadway for the batch trucks which back under it for their loads.

To deliver the weighed aggregates to the batch compartments in such a way as to prevent cement running out the sides and to eliminate the use of two extra men to shovel sand to the sides as each truck pulled away from the batching plant, always a source of delay necessitating an extra truck or two for hauling, the Colo-

nial Sand & Stone Co. engineers, in cooperation with J. W. Davis, Concrete Technician in charge of inspection for the Consulting Engineer, designed and installed a "divider" which is suspended immediately beneath the discharge of the batching hopper. It looks like a pair of metal "shorts" for some great mechanical man. The sand and stone shoot down the two legs and pile up at the sides of the batch compartments in the truck, thus leaving a central pocket in each batch for the cements and preventing leakage at the sides.

The individual batches, as weighed, were as follows:

Crushed stone, No. 3A, 2 $\frac{3}{4}$ to 1-inch	1,741 lb.
Crushed stone, No. 1 and 2, 1 $\frac{1}{2}$ to 3 $\frac{1}{2}$ -inch	1,173 lb.
Sand	1,620 lb.
Portland cement	752 lb.
Natural cement	107 lb.
Water	32 gal.

(Theoretical water for dry batch, 42.7 gals.)

The batch weights were proportioned by the method recommended by Dr. T. Goldbeck, Engineering Director of the National Crushed Stone Association.

## Form Setting

All grading for form setting last autumn was done by hand and the 12-inch Blaw-Knox forms were kept at least 50 feet ahead of the paver by a crew of fifteen men who handled the form setting and fine grading. The forms have a 1 $\frac{1}{2}$ -inch base and the brackets are made for the use of two 30-inch pins to hold the forms in position. Because the forms are set 12 $\frac{1}{2}$  feet apart, necessitating heavy finishing machines, it was expected that both pins would be required and possibly intermediate pins through the base. It was found, however, that only one pin was needed in each bracket and the forms remained in perfect alignment.

Adjacent slabs are keyed by a trapezoidal notch in the sides formed by a metal strip on the steel road forms. This strip makes a key 1 inch deep, 4 inches wide at the forms, and 3 $\frac{1}{2}$  inches wide at the 1-inch depth.

## Battling Blown Sand

The contractor has experimented with several ways to overcome the menace of fine sand which is easily blown by light winds and is carried to heights of as much as 40 feet by strong breezes. Over

(Continued on page 24)

# New Asphalt Surface On California-U.S. 101

**Section of Redwood Highway Damaged by Airport Hauling Gets New Base; Armor-Coat Method Changed by Weather**

† ALTHOUGH "Sunny California" is a term generally applicable, there is one section on U. S. 101, the Redwood Highway, in Del Norte County, the most northerly coast county of the state, where probably the heaviest annual rainfall of the United States interferes seriously with bituminous construction. This, coupled with the county's almost uniform temperature of 50 degrees with only a short period of warmer weather, made it necessary to modify slightly bituminous armor-coat procedure on a contract performed in 1944 by Marshall M. Hanrahan, of Redwood City, Calif., to permit utilization of dry days when the air temperature was only slightly below the minimum 65 degrees specified for bituminous work in California.

This maintenance contract was

awarded pending an early post-war relocation of the highway which has been seriously damaged by the heavy hauling incident to the construction of a Navy Airfield near Crescent City, and consisted of the placing of a 4-inch gravel base and a three-course armor-coat top on thirteen different sections of the road varying from 1,000 to 5,000 feet in length and aggregating 4.7 miles, with the extreme limits 9 miles apart.

The existing base on these sections was scarified and reshaped, the old top having been completely destroyed, and a 4-inch compacted crushed-gravel base was added. This base material, produced from a river bar near the north end of the job, had a plasticity index of not more than 6 and a California bearing ratio of not less than 80. This portion of the work, including the application of the MC-2 prime coat, was finished by November 20, 1943, too late in the year to permit completion of bituminous operations, although the aggregates had been produced and stockpiled during the production of the base material. The final phase was complete in 1944.

## Delivery and Storage of Asphalt

This job, remote from rail delivery and with its production schedule made uncertain by adverse weather, presented difficulties in the proper scheduling and storage of asphalt deliveries. These were made by commercial haulers from Oleum in the San Francisco Bay region nearly 400 miles away in trailer tank loads of 5,000 gallons each.

Storage was provided in three tanks of 2,500-gallons capacity each, with the distributor used at times for auxiliary storage. The three tanks were mounted on one International and two Sterling trucks which were parked and blocked side by side near the site of the aggregate

(Concluded on page 34)



C. & E. M. Photos

The batching plant at Idlewild, showing the aggregate batchers in the foreground and the two cement batching plants at the right. Above, the sheet-metal divider beneath the aggregate batching hopper.

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# How Virginia met the need for a heavy-duty pavement

Virginia Highway Engineers decided last summer that five miles of Route 168 needed a heavy-duty pavement. They elected to use Asphaltic Concrete construction for the project, specifying this type not only for the wearing surface, but also for the foundation.

An interesting feature of the new 6-inch Texaco Asphaltic Concrete pavement on Route 168 is that it was constructed in four courses—two layers of Coarse-aggregate Asphaltic Concrete for the 3½ inch foundation and two layers of Fine-aggregate Asphaltic Concrete for the 2½ inch wearing surface.

Much of the traffic to and from the busy Hampton Roads section of Virginia will use this new pavement on Route 168. That the resilient, durable qualities of Texaco Asphaltic Concrete are fully equal to the hardest kind of usage has been demonstrated over a period of 40 years on many of America's most heavily travelled roads and streets.

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## Planning for Flight Strips Needed Now More Than Ever

Originally conceived as an aid to civilian flying, the Flight Strip went into service for the Air Forces at home along our seaboard largely to serve as auxiliary landing areas for submarine patrols, for the dispersion of aircraft around air bases, and for contact flying along established routes. Today, we have plans for adding hundreds of these Flight Strips to our aviation equipment, but they are largely in the coastal area.

Planning during the past year has turned increasingly toward the completion of contract plans for that day when our enemies across the seas shall have been sufficiently drubbed to permit release of materials and man-power from employment in necessarily destructive activities to employment in construction. We all look forward to C-Day, which will mark the start of civilian construction.

Aviation authorities look to the planning and construction of thousands of additional airports as terminal or connecting facilities for the increasing network of domestic and global airlines. Highway engineers are getting their contract drawings completed as rapidly as possible to provide new and better transportation facilities at the terminals of our cross-country ground network of transportation.

Then there is that common meeting ground of aviation and highways, the Flight Strip, where the highway engineer plans safe, convenient and readily accessible auxiliary landing areas for the private or commercial plane that is "out-of-gas", "running-on-three-cylinders", or just has to get down to earth for a few minutes with an assured prospect of getting off again. Highway engineers have complained of lack of design-power to carry the great burden of planning for deferred reconstruction, for parkways and for links in the Inter-regional Highway System, so that nothing has been heard of planning for the needed expansion of the Flight Strip program through the length and breadth of the land.

"First things first" is heard from all quarters, and the highway engineer thinks first of his own transportation facility, but he must realize that his is but a link in the great air-rail-road-water transportation system of the nation. He is planning better connections with rail-heads in the cities, better connections to outlying airports, but there is still that vast rural area over which millions of miles of new air travel will be flown when the air-minded have their own Sky-cars, helicopters and Autogiros. It is the duty of the highway engineer to plan for the wider right-of-way to accommodate the future Flight Strip, that safety belt

for private planes in particular, so that in case of emergency the owner and his family will not have to bail out and let the plane crash where it may. Instead he can set the craft down in time on a Flight Strip, have highway transportation at hand for service, and a runway that will aid his renewed flight toward vacation or home.

Between 1937 and 1944 nineteen state highway departments were authorized by statute to construct Flight Strips and/or landing strips, (Florida, Illinois, Iowa, Kansas, Maine, Nebraska, Nevada, New Hampshire, New Mexico, North Dakota, Oklahoma, Oregon, Pennsylvania, South Dakota, Texas, Washington, West Virginia, Wisconsin and Wyoming), while nine more did not require special legislation (Arizona, California, Georgia, Montana, New York, North Carolina, South Carolina, Utah and Virginia). In addition, Indiana, Louisiana, Massachusetts and Vermont have sufficient authority to construct Flight Strips without specific legislative authorizations, but it is advisable for all states to enact the model state law to facilitate uniform construction and administration. Copies may be secured through this publication.

Speaking before the Association of Highway Officials of the North Atlantic States, L. Welch Pogue, Chairman, Civil Aeronautics Board, appealed to highway engineers for more Flight Strips. He pointed out that the Atlantic City Airport had not been used as fully as anticipated because of the extensive marshy approach areas which are without auxiliary landing facilities. The mental hazard of flight over such areas, Mr. Pogue believes, has deterred private planes from making the flight to the seashore air terminal. So Flight Strips scattered in the valleys of mountainous areas, in clearings of wooded sections, and throughout the marshy portions of coastal areas will both protect and encourage private flying. This is an opportunity and a duty of highway officials of our state and county governments.

Civilian gasoline supplies are barely adequate to meet present ration requirements, the Petroleum Industry War Council discloses, and there will be no more until Germany is defeated. Use your gas and oil wisely.



"I just saved the first thing I could lay my hands on."

## Diversion Amendment Wins and Loses, Nov. 7

The voters of the State of Washington on November 7, 1944, approved an amendment to their state constitution requiring that all special motor-vehicle taxes be spent solely for highway purposes. This brings to sixteen the number of states with such amendments.

Heretofore, in no state whose voters have had the opportunity to vote on a diversion amendment has such an amendment failed of adoption. Unfortunately, on the same date that Washington voters approved their amendment, the taxpayers of Nebraska turned down a similar amendment. It is reported that this was due to a large extent to opposition from sources which now benefit from diversion.

## Pennsylvania Condemns Signs on Scenic Road

Advertising signs within the limits of twenty-two scenic areas in Pennsylvania are to be removed as soon as possible by order of the Secretary of Highway to Division and District Engineers. Authority to take such action to protect scenic sections of highway from the encroachments of commercial signs is provided by several acts of the Pennsylvania State Legislature.

## NATURAL GROWTH AIDS MISSOURI ROADSIDE DEVELOPMENT

Nature has proved a help to State Highway Department engineers in Missouri in establishing cover on steep slopes. 1. First stage of plant succession on a vertical loess slope, showing sumac and sweet clover. 2. An advancing stage of growth of sumac, elm, sweet clover, ragweed, foxtail and other grasses. 3. Bittersweet vine covering a steep loess slope. 4. Here sumac almost completely covers a vertical cut slope of loess. 5. A close-up of grasses which have invaded a loess cut slope, showing their density. See article on page 22.





# EVERY ROAD-MIX JOB NEEDS A "SEAMAN"

Mixing bitumen in old material pulverized with Seaman

Gravel-clay stabilization in airfield construction

Mixing bitumen in aggregate spread flat

Soil-cement shoulder stabilization

Pulverizing soil prior to stabilization

Throwing roots to surface for removal. Land clearing

Runway stabilization with soil-cement

Stabilization with calcium chloride

Mixing bitumen and aggregate in windrow

Asphalt city street. Close to curb operation

Cross-mixing to blend out variations in material

Shattering and pulverizing runway ice for removal

Aerating bituminous mix to lower solvent content

Dry mixing in soil-cement construction

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# Connecticut Plans A New Major Route

## Careful Studies of Local And Through Traffic in The Waterbury Area Basis For Post-War Project

POST-WAR planning has been in progress since 1941 for a new east-west route connecting the Hartford, Conn., area with the New York metropolitan area. Extensive traffic studies, surveys, and conferences with local officials have been carried on by the Bureau of Highway Planning Studies, Connecticut State Highway Department, and careful consideration has been given to the traffic problems in Waterbury, which is not now served by an adequate through artery and whose local traffic problem is great. In its broadest sense, the study covers U. S. 6 from Southbury, southwest of Waterbury, to Hartford. The immediate determination, however, has been limited to the portion from Southbury through or around Waterbury to a connection with existing facilities such that the eventual development can be continued to Hartford. This project is one of those included in the advance engineering program financed partially by Federal-Aid highway funds and directed toward the development of complete surveys and plans during the present period.

### The Waterbury Area

Waterbury, with a population of about 100,000, is the largest city in the heavily industrialized Naugatuck Valley of southwestern Connecticut. Suburban areas of Middlebury to the west and Watertown to the northwest have populations totaling about 10,000. Both up and down the Valley, that is, north and south from Waterbury, there are numerous small industrial centers.

The terrain in the Waterbury area is very rugged. The Naugatuck River runs through the city, but the so-called "Valley" has little to justify the name. Only a very small area in the center of Waterbury is reasonably level. The remainder of the city is situated in topography ranging from hilly to precipitous.

The major highways through the city of Waterbury are Conn. 8, which follows the Naugatuck River, and U. S. 6A, the east-west route. Other highways are Conn. 73, which goes northwest to the suburban area of Watertown; Conn. 69, which goes north to Bristol and south through Prospect to New Haven; and Conn. 70, which goes southeast to Cheshire. U. S. 6 does not, in its present location, go through the city; it passes north from Southbury through the villages of Woodbury, Watertown, Thomaston, and on to Bristol, coming within about 6 miles of the center of Waterbury at the nearest point in Watertown.

In its present location, U. S. 6 is extremely inadequate as a major highway

facility for its entire length between Southbury and Hartford. Several sections of the road were constructed to a width of 16 feet as long as twenty-five years ago. These sections, as well as a good portion of the remainder of the route, have been made usable for present-day traffic only by extensive and intensive maintenance, largely shoulder strengthening to carry traffic. All of the routes radiating in the area from the city, either to the east, west or north, are unsatisfactory in various respects and in varying degrees.

### Traffic Survey

To provide a basis for analyzing the traffic movements in the Waterbury area, an origin and destination survey was conducted in 1941. Interviews were obtained largely in the month of November at stations located on all routes west, north, and east of the city, and on U. S. 6 in Watertown. By expansion of the interview data obtained at the various stations, it is possible to determine the approximate volume of traffic moving between all principal origins and destinations of traffic bound either through or into this area of the state in an east or west direction. Traffic volumes are expanded to 1955.

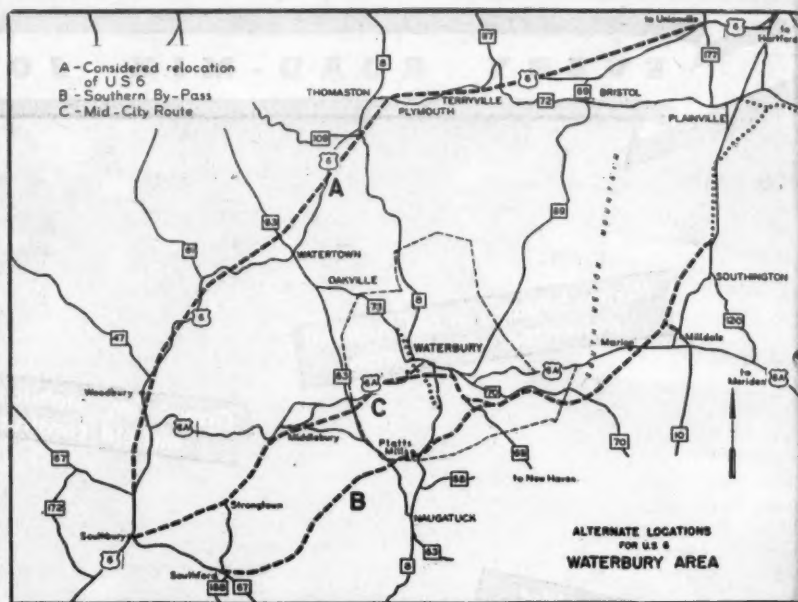
The vehicles making trips to the east from Waterbury (5,149) and west to Southbury and beyond (1,105) give a total of 6,254 vehicles a day in and out of Waterbury to the east and west, or nearly eight times the total amount (820) of east and west through traffic. It is obvious, therefore, that any comprehensive plan for a major east-west improvement in the Waterbury area which is not aimed primarily at highway conditions affecting traffic bound in and out of Waterbury will not be well founded.

### Alternative Improvements

Superficially there appear to be three general possibilities for improvement to provide a high-standard east-west route through the Waterbury area. The possibility which first suggests itself naturally is to improve U. S. 6 as nearly as possible along its location serving the various villages and carrying the through traffic around Waterbury on the north. The second possibility is to provide as direct a route as possible from Southbury into Waterbury and then out to the east to make connection such that the route can be continued north to Hartford. The third possibility is to construct a new route by-passing Waterbury to the south.

U. S. 6 in its present condition is badly outmoded. It follows the historic trail from village to village with almost no changes in alignment or grade down through the years. The route's lack of modern grade and alignment is not the

(Continued on page 28)



## Precast Concrete Blocks for Riprap

### Rectified Channel at Barker Dam Flood-Control Project Near Houston, Tex., Lined With 1-Ton Blocks

FOR protection of the channel of Buffalo Bayou, rectified to improve its discharge capacity as part of the Barker Dam, Houston, Texas, flood-control project, (See C.&E.M., Nov., 1944, pg. 15) the Galveston Office of the U. S. Engineers, awarded a contract in October, 1943, to Fulton Construction Co. of Houston, which provided for the placing of concrete blocks, 3 feet square and of varying thicknesses, on the bottom and sides of the newly constructed channel and around culverts crossing a drainage ditch located 200 feet downstream from and parallel to the dam.

### Precasting

Simple forms for precasting these concrete blocks were constructed of 1/2-inch plywood, with two exterior wales of 2 x 6 lumber pin-hinged at the corners so as to open readily for stripping. The blocks, which are 3 feet square, and in 12, 18 and 24-inch thicknesses, are chamfered on each corner and have three 3-inch vertical grooves in each side. Chamfers and grooves were formed by nailing diagonally ripped 4 x 4 timbers inside the plywood forms.

Sand and gravel was shipped from any of several plants of the Thorstenberg &

Placing precast concrete-block riprap in Buffalo Bayou as part of the Houston, Texas, flood-control project, lower left photo. Lower right, ingenious hinged wood forms were used by the Fulton Construction Co. for casting the blocks, which were cured by the Hunt Process, as shown at right.

U. S. Engineers Photos

Tamborello Gravel Co., while cement came from the Universal Atlas Portland Cement Co. at Waco, Texas, both going to the precasting yard at a railroad siding at Addicks. Aggregates were unloaded by an American Hoist & Derrick track-mounted railroad steam crane with a 1-cubic-yard Williams clamshell bucket, and delivered to Butler 30-ton steel bins. The bulk cement was unloaded to 2-wheel carts on a platform in front of the car doors, weighed on Fairbanks Morse scales, and delivered to the batch trucks. The 25 1/2-cubic-foot batches, containing the equivalent of 5 sacks of cement per cubic yard and 6 1/2 gallons of water per sack of cement, were mixed in a Koehring 27-E paver, equipped with spout instead of a boom and bucket. This paver, fed by two trucks, travels alongside rows of block forms placed on the previously leveled ground of the casting yard. The concrete was vibrated by a Bailey vibrator, and the blocks were cured by the application of Hunt Process compound. A crew of twenty men at the casting yard produced an average 18 blocks per 9-hour day.

Forms were stripped the second day and reassembled on an adjacent level area and reused. When the precast blocks had attained sufficient strength they were moved to storage piles by the same crane used for handling aggregate with grab hooks substituted for the clamshell bucket. After further curing (Concluded on page 21)





# Portraits in Print

By BILL QUIRK

## Pennsylvania Contractor to Be President of ARBA for 1945

✦ JAMES J. SKELLY, general contractor of Media, Penna., has been elected President of the American Road Builders' Association for 1945. Mr. Skelly has been Vice President at large and head of the Highway Contractors Division of the ARBA since 1943. The attention of the highway industry was attracted to Mr. Skelly when, at the 1943 annual banquet in Chicago, he spontaneously arose and pledged \$50,000 from the contractors in his group to aid in financing the promotion of the ARBA post-war highway program throughout the country. At a meeting of contractors from fifteen states, which was later held in Philadelphia, the sum to be raised was increased to \$100,000, 40 per cent of which was to remain in the state in which it was collected and the remainder to be used on a nation-wide scale. Three-quarters of this money has already been realized.

"It doesn't make sense to me," said Mr. Skelly in a recent interview at the Bellevue Stratford Hotel in Philadelphia, "to win the war and risk losing the peace by failing to have a plan ready to give jobs to returning service men and those workers who will lose their jobs in war plants with the cessation of hostilities. We can win the peace at home only if these men get jobs. A few weeks ago I listened to a speech in this hotel by an official of one of the largest manufacturers of automobiles in this country, during which he said it would take at least a year for his company to begin production of motor cars after the end of the war. In the meantime, the only way to prevent wide-spread unemployment is through the construction industry, but for this we must have a plan and this plan must be ready when the time comes to use it."

James J. Skelly is a soft-spoken reserved man with an earnest manner indicative of the seriousness in which he holds the course this country must follow with relation to an adequate highway program at the end of the war. At 62, Jim Skelly, as he is known in contracting circles throughout eastern Pennsylvania, is an erect, 6-foot, ruddy-faced, powerfully-built man of 200 pounds, with thinning, closely-cropped grey hair and alert eyes behind horn-rimmed glasses. He was born in Norristown, Penna., where he was graduated from St. Patrick's School and then went to work first as a water boy and later as a driver of a dump cart for his father who was in the contracting business.

### Working on the Railroad

Though still a boy, albeit a husky one, young Jim was attracted to the romance of railroading and left his father's employ to work for the John T. Dyer Construction Co. which, at that time, was building the 60-mile freight cut-off line between Coatesville, Penna., and Trenton, N. J., by-passing Philadelphia. Jim worked first as a "gandy dancer", so called because of the vigorous action of the feet when pushing stone ballast under wooden ties with a spade before the days of pneumatic tampers, but he soon rose to the position of "walking boss", which is the equivalent of superintendent in a railroad construction gang today.

"That 'walking' adjective was a misnomer," said Skelly with a reflective smile. "When I married, I had to get someone to take my place for my short day-and-a-half honeymoon, so I picked a foreman by the name of Welch. I was married on Wednesday and when I re-

turned to work Thursday noon there was Welch to meet me with his tongue hanging out and breathing hard as he gasped, 'They may call this job a "walking boss" but I've been running ever since you left.'

"I was paid \$100 a month on that job," Skelly continued, "and later was made superintendent of the Dyer Co. crushed-stone quarry near Locksley, Penna., which at that time was the largest in this part of the country. Yes, I suppose it was quite a responsibility for a lad under 21, but boys went to work early in life in those days and were doing a man's job while still in their teens.

For my part I probably thought and acted 20 years older than I really was. I managed to save a little money and in 1904 I started a contracting business of my own in nearby Media where I have been ever since.

"My first job was excavating for cellar foundations and I used horses, dump wagons which were loaded by hand, and the old wheel scoops which took two men to load. I broke into road work by getting a subcontract on the state highway between Media and West Chester, doing the grading and laying a Telford base for a water-bound macadam road. And that base is still there after more than 35 years of service."

### Current Work

Skelly is proud of his early road building and also of his present office and yard in Media, 14 miles southwest of Philadelphia on U. S. 1, the Baltimore Pike. Besides the office there are two concrete-block buildings, one 50 x 100 feet and the other 20 x 150 feet, which are used as garages, repair shops and

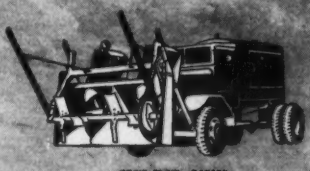
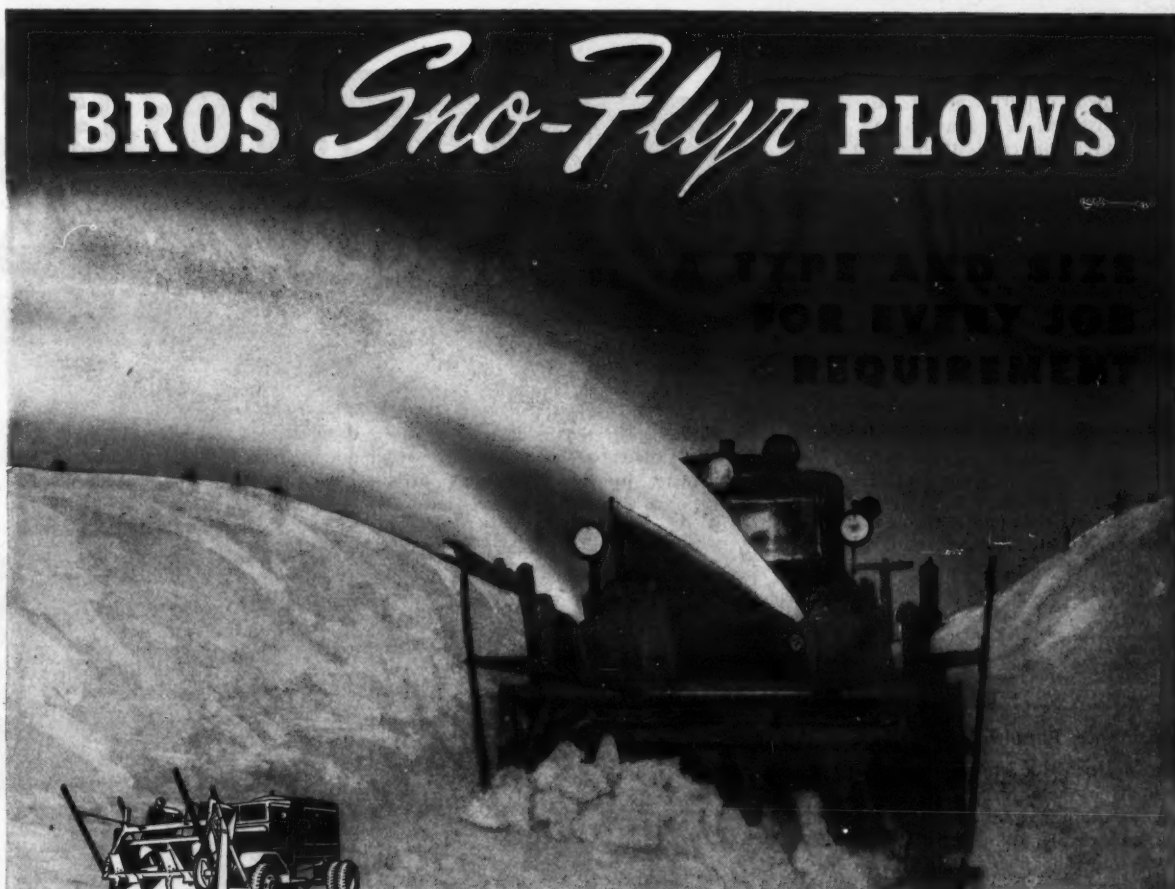


James J. Skelly, general contractor of Media, Pa., 1945 President of the American Road Builders' Association.

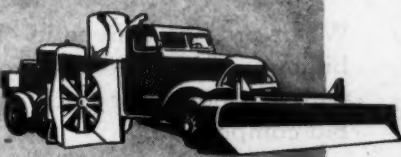
storage quarters. Besides road construction, the Skelly company builds sewers, (Continued on page 82)

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# BROS *Snow* PLOWS





# Town Forces Maintain Monroe County Roads

## Varied Types of Resurfacing Are Used on 579 Miles of Highways in County in Western New York State

MONROE County, New York, which borders on Lake Ontario and includes the city of Rochester, has a versatile highway department which maintains 579 miles of all types of county roads. During 1944, because of the war, the construction and reconstruction of all highways was sharply curtailed. For example, only 5 miles of roads were resurfaced with bituminous macadam last year as against 25 miles annually in pre-war years, while a shortage in stone resulted in the surface treatment of only 100 miles of roads in 1944, compared with the pre-war average of about 135 miles.

The 625 square miles of Monroe County are divided into nineteen townships. The men and equipment of these town highway departments are hired to do the construction, reconstruction, and snow removal on roads throughout the county, and the repairs and maintenance of equipment are the obligations of the individual towns. The towns of Irondequoit and Greece have modern garage facilities for this purpose, while three other towns are planning to erect garages and shops after the war.

The Good Roads Committee of Monroe County is composed of Raymond J. Lee, Chairman, and Gordon A. Howe, Fred Leverenz, Fred C. Sours, Henry U. Rothfuss, and A. Gould Hatch, members. Francis H. Carroll is County Director of Public Works, with Fred C. Line his Assistant Engineer. The County publishes an excellent road map on a large scale showing all types of roads within its boundaries. These roads are divided as follows:

Classification	Mileage
State highway system	355
County road system	579
Town highways, hard-surfaced	401
Town highways, gravel and unimproved	175
Total mileage of highways outside of city and villages	1,510

### Bituminous Penetration Macadam

On Malloch Road in the town of Riga, a 3-inch course of bituminous penetration macadam was placed last year on a 9-inch gravel sub-base for a distance of one mile on an 18-foot waterbound-macadam surface laid in 1936. This old surface had become rough and bumpy so it was broken up for a 2-inch depth by an Austin-Western No. 99 power grader with scarifier. After it was well bladed, the broken material was rolled by a 12-ton 3-wheel Buffalo-Springfield gas roller. Then the 9 inches of bank-run gravel from a local gravel pit was spread and rolled. Three Brockway trucks, of 7 to 10-ton capacity, were used for the material haul.

When the gravel was well compacted, a 4-inch loose course of No. 3 stone was spread, which was rolled and compacted to a 3-inch layer. No. 3 stone must pass 100 per cent through a 3 1/4-inch screen and 90 to 100 per cent through a 2 1/4-inch screen. The same trucks that hauled

the gravel were used to transport broken stone from the LeRoy Lime & Crushed Stone Corp. located 9 miles away at LeRoy, N. Y. This aggregate was a hard limestone which did not require too much rolling. The stone was spread by two Burch stone spreaders which, along with the three trucks used, are owned by the Town.

Asphalt was applied to this layer of crushed stone at the rate of 1 3/4 gallons to the square yard. Pressure distributors from two Rochester concerns, the Midland Asphalt Corp. and Michael E. Sweeney, about 15 miles away, applied the 85 to 100-penetration asphalt at a temperature of 300 degrees F. About 18,500 gallons of asphalt were used in this operation.

The voids in the No. 3 stone were then

filled with No. 1 stone which passes a 1/2-inch screen but is retained on a 1/4-inch screen. This stone was applied by a spreader made by the Town of Riga maintenance forces and consisting of a box 9 feet 6 inches long x 2 feet 6 inches wide which was fastened to the town-owned trucks. Just enough of this fine material was spread to cover the surface. It was then broomed by a combination of four 7-foot brooms fastened in a frame 14 feet long x 7 feet wide, pulled by an International Type B mower-tractor. The surface was then compacted by a roller. On an exceptionally hot day this procedure was reversed; the rolling was done first, followed by the brooming.

A seal coat of the same penetration asphalt was next applied at the rate of 0.5 gallon to the square yard. This was covered with a thin layer of No. 1 stone, broomed, and rolled as before. Another coat of lighter asphalt, 80 to 120 penetration, followed at the rate of 0.4 gallon to the square yard. This was covered with a thin layer of No. 1A stone, which

passes a 1/4-inch screen but is retained on a 1/8-inch screen. After brooming and rolling, the road, which had been closed during full-width construction, was opened to traffic.

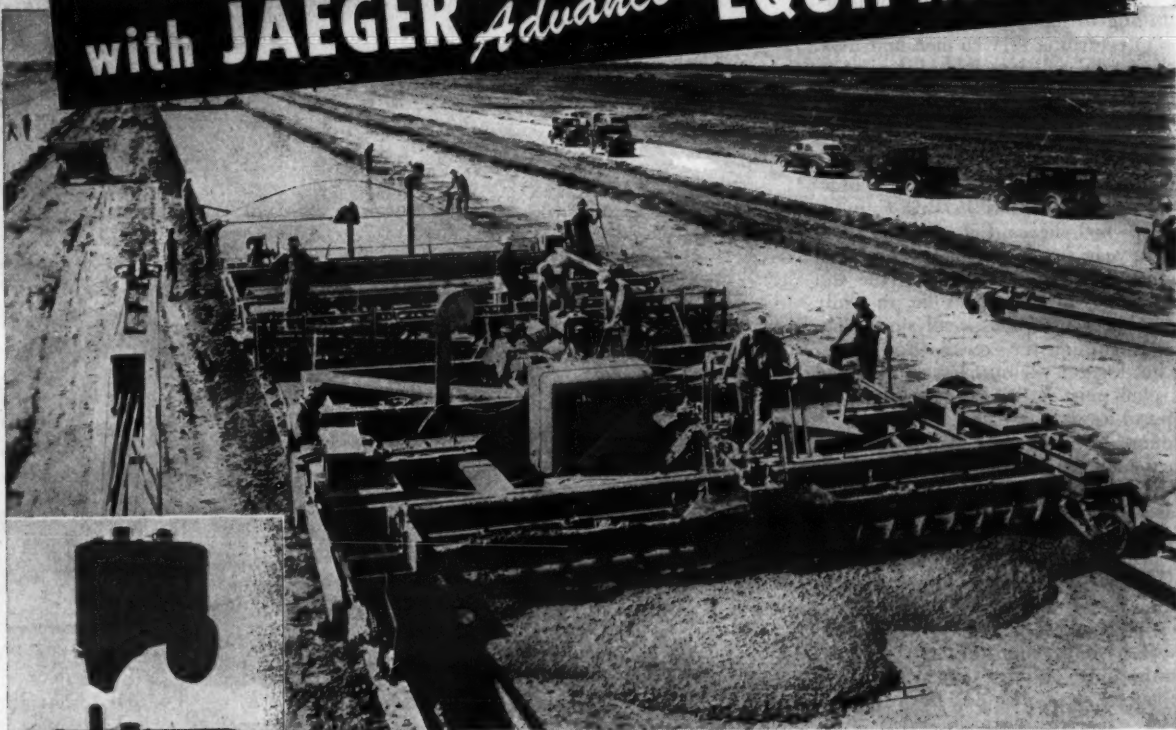
This work was performed by seven maintenance employees of the Town of Riga under the direction of Town Superintendent Fred Wingate. In the past about twenty men would be used on a job of this kind but, with the labor shortage, equipment such as the stone spreaders has taken the place of hand labor.

### Bituminous Retread

A half-mile section of 18-foot bituminous-paved Town Line Road in the town of Sweden was given a retread last year by the Town maintenance forces. Two curves connecting this road with Beadle Road and Chambers Street were widened and graded and given some superelevation, these operations being performed by an Austin-Western 99-M power grader. A 3-inch layer of run-of-bank

(Concluded on page 35)

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**REPAIRS—any make**

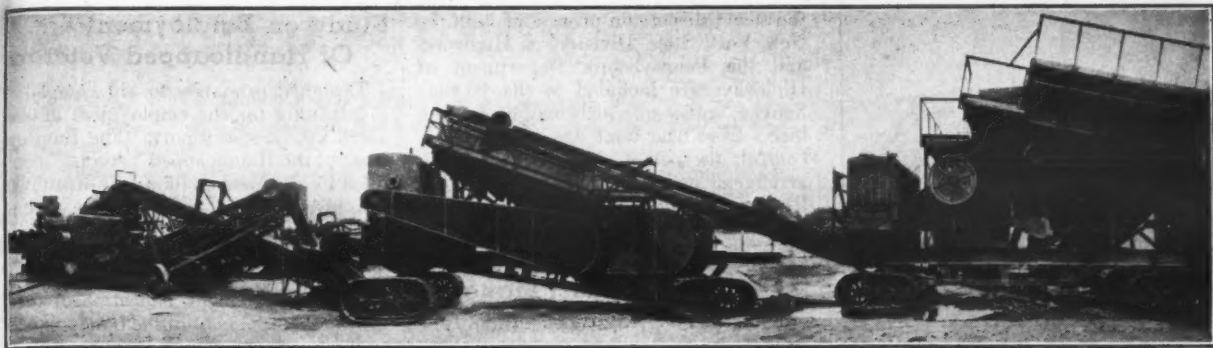
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The giant Pioneer rock crusher plant for the Corps of Engineers.

## Crusher Plant Aids Engineers in France

A mammoth Pioneer rock crushing plant, produced by the Pioneer Engineering Works, 1515 Central Ave., Minneapolis 13, Minn., for the U. S. Army Corps of Engineers, is playing its part in speeding the vast shipments of war supplies to the Allied armies fighting on the western front. Rushed to France from England, this 150-ton-an-hour plant is providing gravel for the slippery mud-bogged supply roads leading to the front lines. It is the only one of its type in operation in the European Theater and was assembled as a rush priority job by a special team of U. S. Army construction specialists.

This Pioneer plant, designed for crushing, screening and washing rock or gravel, is composed of nine separate units and requires nine flat cars for shipment. The plant is completely mobile and can be moved on its own tracks and wheels to the location where it is to be set up and used. After finishing the job at that point, it can be disassembled and moved to another site. The complete plant is composed of a jaw crusher with a 30 x 42-inch opening which will take rocks as large as an office desk; three roll crushers; screens; conveyors; and a washer. If necessary, the final crusher will produce sand from these quarry rocks.

The material travels from right to left of the plant as shown in the illustration, first over the feeder, through the jaw crusher, then to the second unit where it is screened and crushed, next to the washing plant, and then to the final crusher. Belt conveyors transport the material between the various units.

Pioneer Engineering Works is one of the largest companies in the United States specializing in the production of rock crushing, screening and handling equipment, and at present is using about twenty subcontractors in the Twin City and Stillwater areas in its war production. Sixteen Pioneer plants were used on the Alaska Highway, and other plants were employed by American contractors and the U. S. Engineers in building the Inter-American Highway to Panama. Many Pioneer plants were used in the construction of camps, air bases, and military highways in this country and abroad.

### V-Belt Handbook

A 74-page V-Belt Handbook for Industrial Applications has just been published by The B. F. Goodrich Co. The handbook discusses the operating advantages of V-belts, qualities to seek in the product, installation and care,

## VULCAN TOOLS

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sheaves, selection of the V-drive, and general information covering the whole field.

Copies of this handbook, which contains numerous technical tables of value to designers, manufacturers, owners or operators of equipment, may be secured from The B. F. Goodrich Co., Akron, Ohio, by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

## Road-Mixed Material For Calif. Patching

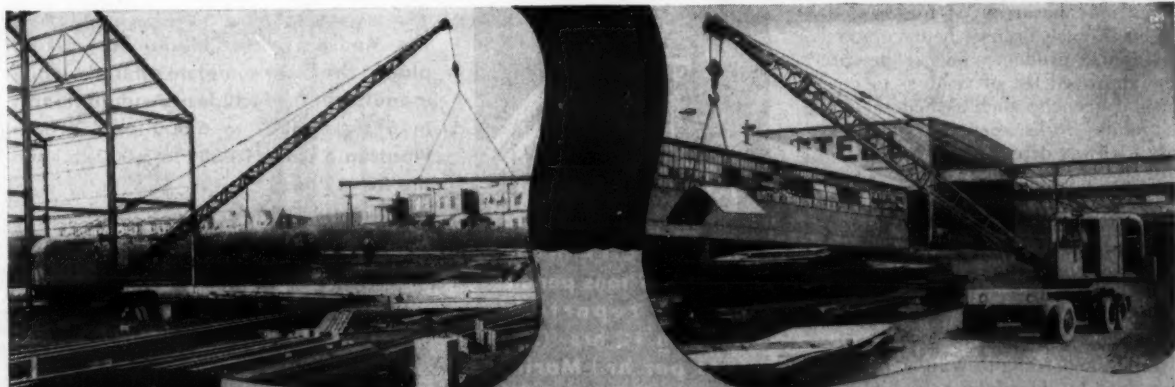
In District 1 of the California Division of Highways, at the northerly end of the state, patches for small surface holes are placed by maintenance forces using pre-mixed materials. Creek-run gravel, with its fines retained but stone larger than 3/4-inch screened out, is

blade-mixed with 4 to 5 per cent of MC-2 or MC-3 cut-back on convenient level areas or abandoned sections of highway. The MC-3 is used if the patching material is to be placed immediately, while the MC-2 is used for the mix if it is to be stockpiled in strategic locations for future patching operations.

Asphalt for this work is stored in quantities of 24,000 to 60,000 gallons in storage tanks well dispersed throughout the District where steam-heating facilities are available and is transported in booster trucks or distributors when needed for mixing.

Patches of small area are placed by hand, rolled by trailer rollers, and sealed by an application of 0.14 to 0.17 gallon of MC-5 per square yard and covered with 18 to 25 pounds of crushed gravel, all of which passes a 3/8-inch screen and is retained on a No. 6.

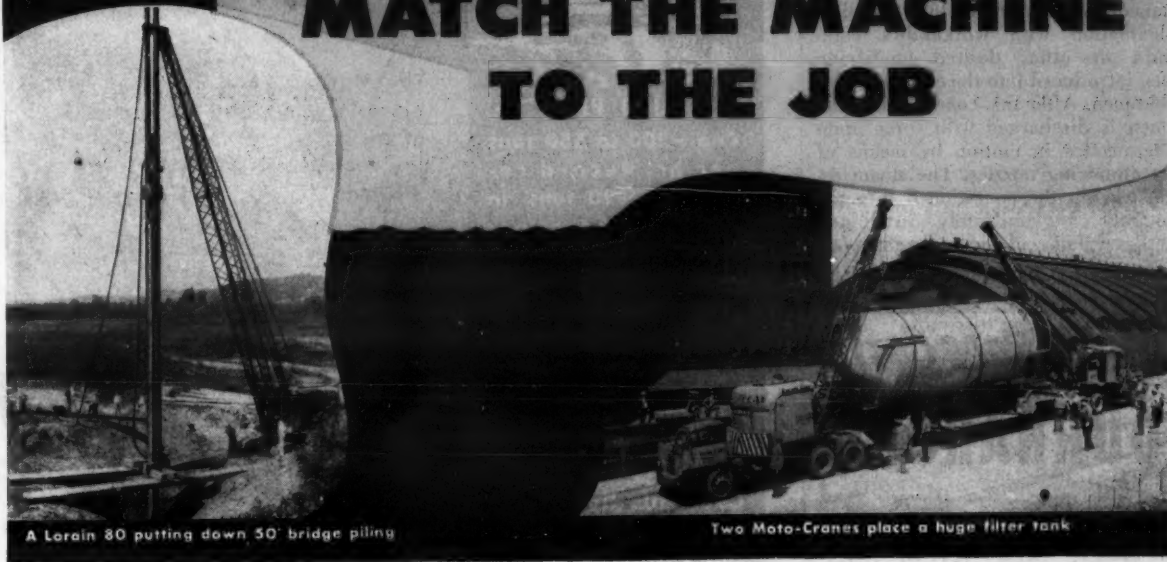
A. M. Nash is District Engineer of District No. 1, California Division of Highways, with headquarters at Eureka, and E. M. Cameron is District Maintenance Engineer.



The Lorain 40-A putting up steel

The Self-Propelled Lorain handling yard stock

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A Lorain 80 putting down 50' bridge piling

Two Moto-Cranes place a huge filter tank

Whether it's driving piles, putting up steel, juggling massive machinery, slinging cement, handling loose materials or any one of a hundred other crane jobs, there's a Lorain crane with proper mounting, boom and equipment to fit the job to a "T". These wide choices show you how it's possible to pick the right Lorain for the job . . . for greatest efficiency and most profit:

### MANY MODELS AND MOUNTINGS

Large crawler cranes up to 31 ton capacity. Small crawler cranes up to 10 1/2 ton capacity. Rubber tired Moto-Cranes, 15 and 20 ton capacity (20 ton is 6-wheel drive).

Rubber tired self-propelled crane, 20 ton capacity.

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THE  
THEW SHOVEL CO.  
Lorain, Ohio

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES





The new steel bridge across the Yellowstone River near Fallon, Montana, which replaces a structure damaged by ice in the spring of 1943. (See C. & E. M., December, 1944, pg. 17). This photo was furnished by H. A. Stephenson, Bridge Construction Engineer, Montana Highway Commission.

## Steam Dispersion For Paving Mixes

Steamix, a patented steam dispersion process applied to bituminous paving mixes of all types, is discussed in detail in a 16-page booklet issued by The Wait Associates, Inc., 51 E. 42nd St., New York 17, N. Y. The use of this process, which is covered by patents and patents pending, may be arranged for on a license basis, such licenses being granted to paving mix producers only if they are on the approved list of vendors to governmental agencies such as Federal and state public works agencies, state and county highway departments, etc.

The steam dispersion process, which was originally developed in California, has been widely used in New York State since 1938. Under this process, the bitumen is properly conditioned to meet the requirements of the customer batch by batch, and the bitumen is applied to the aggregate in a manner to produce the best results, according to Wait engineers. This is done by introducing the bitumen into a conditioning chamber and then agitating it by moderate-pressure steam. This disperses the bitumen into finely divided particles occupying a space many times that of its original volume. The basic bitumen may be, and usually is, simultaneously modified by complete amalgamation with workability compounds, or other desired modifying agents, introduced into the chamber with the bitumen. After this conditioning, the bitumen is discharged with force upon the aggregates in motion by means of steam atomizing nozzles. The steam escapes, leaving the conditioned bitumen thoroughly and uniformly distributed over the surfaces of the aggregates.

Further details on the Steamix process, its performance record, a list of the advantages of steam dispersion process mixes for the paving engineer, the paving contractor, and the paving-mix producer, photographs of typical Steamix pavements, a list of Steamix producers, and the specifications covering

the steam dispersion process of both the New York State Division of Highways and the Pennsylvania Department of Highways are included in the 16-page booklet, copies of which may be secured direct from The Wait Associates, which controls the patent rights and licensing arrangements east of the Mississippi River and in eastern Canada.

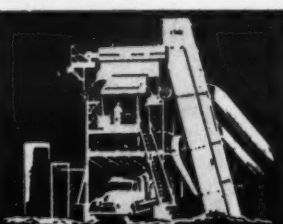
## Universal Engineering Names Export Manager

D. H. Young, 120 Broadway, New York 5, N. Y., has been appointed to direct exports for the Universal Engineering Corp., Cedar Rapids, Iowa, maker of rock and ore crushing, pulverizing, screening, conveying and storage machinery; gravel washing and screening plants; and Twin-Dryer portable asphalt mixing plants. Mr. Young will appoint dealers in all countries outside the United States except Russia, Canada, Mexico, Hawaii, and the Philippines, where distribution arrangements already exist.

## Study on Employment Of Handicapped Veterans

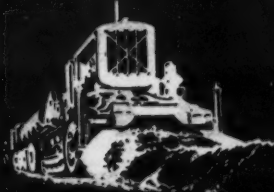
Designed primarily to aid companies in planning for the employment of disabled veterans, a report, "The Employment of the Handicapped Veteran," compiled by the Metropolitan Life Insurance Co., gives in detail procedures in a number of organizations which have already set up machinery for the employment of the handicapped. Aptitude tests, environmental placement, education of foremen in the treatment of the handicapped, training, adjustments to plant conditions and other considerations are treated in detail, and statistics are included showing vocational interests and the types of jobs where handicapped persons may be employed.

Copies of this study, which is one of two dealing with this subject, may be secured upon application to the Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York, N.Y. Just mention this review.



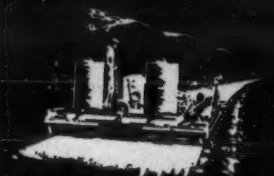
### ASPHALT PLANTS

Cap.—125 tons per hr. Record reported—2414 in 12 hrs. (201 tons per hr.) Marine Base at El Toro, Calif. by Lewis Cons. Co.



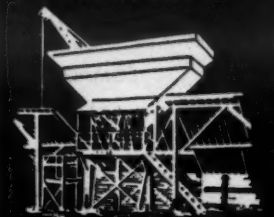
### ROAD PUGS

Cap.—200 to 550 tons per hr. Record reported—7920 tons in 20 hrs. (396 tons per hr.) Phoenix Cons. Co.



### CEMENT FINISHERS

Cap.—300 lin. ft. per hr. Record reported—3065 lin. ft. in 8-hr. (383 ft. per hr.) Albany, Ore. by Roy Houck.



### AGGREGATE BATCHERS



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The Madsen line of bituminous mixing plants, the most complete offered by any manufacturer, includes: Asphalt Plants in 6 sizes (500- to 6,000-lb.), Oil-Mix Plants in 5 sizes (1,000- to 6,000-lb.) and the Road P...

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flexible steel, is designed for smooth spooling on the small drums of a PCU, flexes easily over tractor equipment sheaves, and stands up against the dust and grit of dirtmoving service. To save rope costs on your tractor equipment—use TournaRope!

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## Dirt-Moving Contractor Builds Mining Roads; Has Equipment Shops; Takes Out Big Coal Yardage



**C. & E. M. Photo**

(Continued on page 38)

Douglas fir plywood PLY-FORM panels are "grade trade-marked" with the diamond-shaped stamp shown below. Every panel also has a distinctive green edge-sealing.

**GENUINE  
DOUGLAS FIR  
PLYFORM**  
TRADE MARK REG. U. S. PAT. OFF.  
Concrete Form Panel  
D. F. P. A.

**Above: PLYFORM in use on Santa Fe Dam forms.**  
**Below: PLYFORM concrete forms on Shasta Dam project.**

Douglas fir plywood is now available only on highest priorities. Application for allocation must be made by suppliers to the War Production Board.



## Highway Officials Hold 30th Meeting

**Cincinnati Gathering Was  
Highlighted by Passage of  
AASHO Federal-Aid Bill  
In Washington**

✦ WHAT was probably the largest meeting ever held by the American Association of State Highway Officials was held at Cincinnati, Ohio, November 28-30, 1944. The entire group had "their fingers crossed" as HR 4915 was under fire of amendment on the floor of the House in Washington during the entire period of the meeting. Bulletins "from the Washington front" were read at all general sessions and both relief and pleasure expressed when the bill was finally passed with the most essential features intact.

The meeting opened with an invocation followed by a stirring address of welcome by Governor John W. Bricker of Ohio, to which Samuel C. Hadden, President, AASHO, and Chairman, State Highway Commission of Indiana, responded with his annual address. This was a recapitulation of the activities of the Association during the past twelve months, with references to government regulations and orders which impinged on the work of the various state highway departments.

Introducing his remarks on Federal Aid, President Hadden said, "Since the far away days of the elegant eighties and the gay nineties, which our older members so fondly recall, every generation of Americans has begun its earthly pilgrimage under the happy illusion that the opportunities, the freedoms, and the many fine things comprising the American way of life could all be taken for granted and accepted as a matter of course. It has taken a world catastrophe to remind many of us that these things are not universal or the unfailing gifts of a beneficent providence but that they were originally the fruits of the wisdom, the toil, and the struggles of our forefathers. We have been shocked to learn that they may only be preserved by the wisdom, the toil, and the struggles and sacrifices of ourselves, the Americans of today."

"Similarly, most of us in the highway fraternity can remember but dimly, if at all, the status of highway development before the present system of Federal Aid for highways, and the policy of close cooperation between the states and the Federal government, was instituted in this field. Certainly none of us knew much about building automobile roads before this relationship began, for less than 2,000,000 motor vehicles had been built when the Federal Aid Road Act became law on July 11, 1916. Many of us may have taken this fruitful system and policy for granted and falsely assumed that they would continue automatically and indefinitely without further effort or attention on our part. There may even be some who see the defects in the system more clearly than its advantages and doubt its present usefulness."

"Having reached the conclusion that it is necessary to sell and resell, and keep on selling, this partnership between the Federal and state governments in road construction, we decided to feature

this subject in some of the formal papers prepared for presentation to this convention. We took cognizance of the growing opposition to going to Washington for money, and we noted also that many who opposed the spread of the Federal-Aid idea to other activities than road building have a tendency to conclude that the best way to prevent this spread is to uproot all present forms of Federal Aid. Even some great newspapers have opposed Federal highway aid for the admitted reason that it was the first and most satisfactory example of this phase of governmental policy. We heard just enough of this sort of reasoning to become concerned about the future of Federal Aid for highways so we decided to have some papers prepared which will review the benefits of this policy from the standpoint of the states, the Federal government and the Congress. These papers will be reprinted in pamphlet form and made available for distribution to newspapers, libraries, public officials, legislators, and to other interested persons and organizations."

The concluding portion of the opening session was devoted to the presentation of a testimonial to Thomas H. MacDonald, Commissioner, Public Roads Administration, in honor of his twenty-five years of service as head of the two Federal highway bureaus which have existed during that period. This was followed by the presentation of the George S. Bartlett Award to Charles H. Purcell, Director of Public Works of the State of California. This award is made annually to some individual who has made an outstanding contribution to highway progress. Normally the award is made at the annual meeting of the Highway Research Board, but because of the cancellation of that meeting the presentation this year was transferred to the highway officials program.

### Federal Aid Reviewed

The Tuesday afternoon session was devoted to hindsight and foresight as regards Federal-Aid highway construction. The paper "The History of Fed-

(Continued on page 58)



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# Announcement

## Cletrac joins OLIVER

The acquisition of "Cletrac" by The OLIVER Corporation proves the importance with which the corporation views the manufacturing and marketing of tractors for industrial and construction needs. To meet the requirements of these users, an Industrial Division of the corporation has been established.

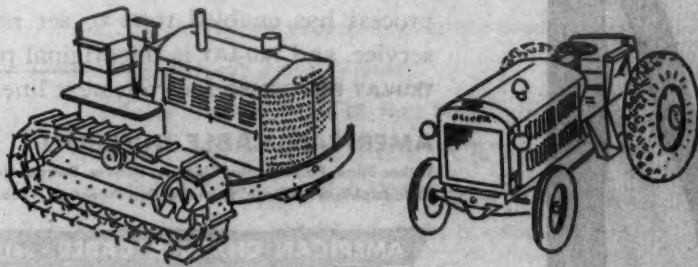
The Industrial Division of The OLIVER Corporation will have its headquarters at 19300 Euclid Avenue, Cleveland 17, Ohio. In addition to the well known "Cletrac" line of track-type tractors and allied equipment, the Industrial Division will also have in its charge, sales and service of industrial tractors of the wheel type now in development as well as other industrial products long manufactured by The OLIVER Corporation.

"Cletrac" Tractors for agricultural service will be handled by the Agricultural Division of The OLIVER Corporation, 400 West Madison Street, Chicago 6, Illinois.

Bringing to "Cletrac's" already ample research, engineering, manufacturing and service the corresponding facilities of The OLIVER Corporation, means that a complete line of even better "Cletracs" will be manufactured in the future and that service to "Cletrac" owners will be enhanced.

The dealers who sell OLIVER "Cletrac" Tractors are now in a position to serve you more completely than ever. The OLIVER Corporation, 400 West Madison Street, Chicago 6, Illinois.

### The OLIVER Corporation





## N-P Railroad Tunnel Driven in Montana

(Continued from page 1)

The repair-shop equipment includes forges and hand blacksmith tools, while a Chevrolet truck carries a Westinghouse arc welder, with racks for gas tanks with which Smith welding and cutting torches and valves can be used for making repairs either at the shop or at other points around the project.

In the compressor house is a 1,250-cfm Ingersoll-Rand stationary compressor driven by a 250-hp electric motor, to which was added a 500-cfm Gardner-Denver compressor with a 125-hp motor when the bore was about half completed. Set outside, protected from the weather, and connected to the 6-inch air line leading to each tunnel portal, is a 420-cfm Schramm gasoline-driven compressor which was used for drilling on the open cuts at the tunnel ends and was cut in whenever the demand for air at the headings exceeded the available supply. A 110-cfm Schramm portable compressor was used for miscellaneous drilling about the job.

A small mountain stream northeast of the tunnel was dammed by a small earth embankment and from this reservoir a Deming 4 x 4 1/2-inch pump powered by a Westinghouse 7 1/2-hp motor delivers water through a 2-inch line to a 7,500-gallon wooden storage tank located near the compressor house about 200 feet higher than the lake. This water cools the compressors and was delivered by a 7 1/2-hp Ingersoll-Rand pump through a 2-inch line to both portals and inside the tunnel to the working faces.

The ventilation system consisted of a 22-inch-diameter line of light sheet-metal construction with canvas-wrapped butt joints, suspended on the vertical posts at the left side of the tunnel timbering and extended as the work progressed. Near each portal a blower house was constructed, housing electrically driven induced-draft fans, one of 3,500 and one of 7,500-cfm capacity at the



The jumbo moving in at the east portal of the new Northern Pacific tunnel near Bozeman, Mont., for the start of drilling.

east heading, with one of 3,500-cfm at the west heading. With both fans at the east heading operating at capacity,

fumes were cleared from the bore in 30 to 40 minutes after a round had been fired, when the heading was less than

1,200 feet underground. This time increased to 60 minutes with the heading at 1,900 feet.

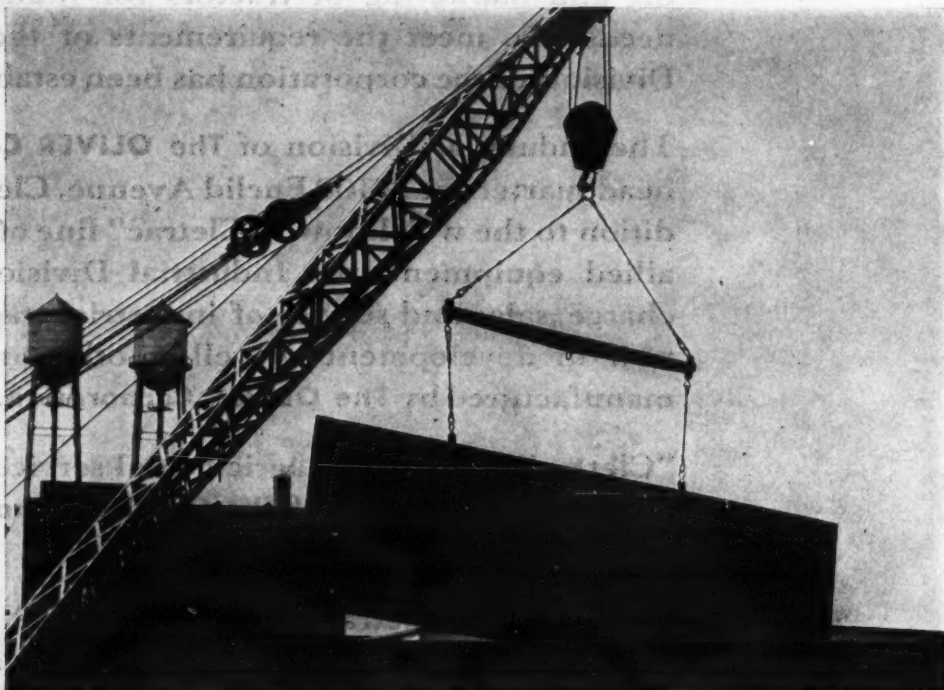
### Material Yard

At the east end of the tunnel an open space provides sidings for the unloading and stocking of materials, the engineers' office, locker and dressing room for the tunnel workers, and the concrete plant. A Speeder crane unloaded the steel ribs for the permanent timbering. These ribs, shipped in gravel cars, were handled by a single cable which one laborer in the car attached to the rib while two men on the ground guided them into position for safe storage and later transfer into the tunnel.

Timber was received in box cars as well as open cars and this delivery required a considerable crew to unload the long and heavy 12 x 12 timbers. Roll conveyors facilitated the unloading and were arranged to convey the posts past a 16-inch Comet and a 36-inch American swinging cut-off saw where they were cut

(Continued on next page)

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It is the preforming process, scientifically applied at the mill, that endows **TRU-LAY** with high fatigue resistance. Being more flexible than non-preformed, **TRU-LAY** bends easily; is pre-broken-in, resists kinking and whipping, spools better. Being free of internal stresses, **TRU-LAY** does not squirm or rotate in sheave grooves. This saves both rope and sheaves. The preforming process has enabled rope to set new and higher standards of service, and **TRU-LAY** is the original preformed wire rope. Specify **TRU-LAY** **PREFORMED** for your next line.

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In Business for Your Safety



## New 3,015-Foot Bore Through Varied Rock

(Continued from preceding page)

to pattern, one saw squaring the ends and the second cutting the proper bevels for the segments forming the roof arch. By turning the post over for the reverse bevel, three segments were cut from a 16-foot piece of 12 x 12 timber. Other timber was also cut to pattern by these saws and stacked in separate piles for future use.

### Portal Excavation

The portal excavation, which consisted of 165,000 cubic yards of common and 130,000 cubic yards of solid rock, was performed by one 2 and one 2½-cubic-yard Northwest shovel loading to seven International K-11 and four 2-ton Dodge trucks for the haul to the waste area, which averaged 1,000 feet from the east portal and 1,800 feet from the west. Since the waste area for the excavation from the west portal lay across the main line from the new tunnel it was necessary to construct a timber overpass to facilitate the haul. Initial stages of the portal excavation, above the grade at which rock was encountered, was done by five LeTourneau 16-cubic-yard scrapers pulled by D8 tractors, with an additional Caterpillar D8 as a pusher and also used to pull a roofer when necessary.

Slopes in the solid rock were made ½ to 1 with a 16-foot-wide bench 30 feet above the floor of the cut and a second bench 10 feet wide, 40 feet higher. The slope between the first and second berms was normally ¾ to 1. Above the second bench the side slopes were increased to 1½ to 1. Despite the fact that the excavation was started in January, not normally a favorable month for construction at the latitude and elevation of the tunnel, and the necessity for keeping the main-line track clear at all times for train passage, the work progressed rapidly and tunneling operations were commenced in February, 1944, at the east heading and in March, 1944, at the west portal.

The requirement for keeping the main line clear necessitated frequent light blasts, limited to 50 pounds of dynamite per shot, so holes were carefully spaced and fired with one to seven delay caps to furnish maximum rock movement per shot.

### The East Heading

Fair rock was encountered from the beginning of operations at the east end of the tunnel. This made it possible to push the entire cross section of the tunnel forward in one operation, thus simplifying procedure and requiring a minimum of construction timbering. The rock was generally a blue sandstone, quite black with some shattered areas and numerous faults. Some shale was encountered. Both kinds of rock had talc seams.

Working from a three-deck jumbo, described in detail later, three crews were used, each consisting of a foreman, eight miners, eight helpers, two nippers, a shovel operator and an oiler, and whatever number of trucks was needed. Help-

ers or chuck tenders served as truck drivers. This crew performed drilling, loading, shooting, mucking, and timbering for an 8-hour period. Each shift was a complete organization capable of performing any part of the cycle, and competent to take up and complete any phase under way at the time of a shift change. A General Superintendent and a Night Superintendent supervised all operations and made decisions as to the depth of a round, which ranged from 6 to 14 feet, dependent on the character of the rock, the spacing of permanent posts, and the amount and position of the lagging.

### The Jumbo

Two identical jumbos were built, from which all drilling, loading, and timbering operations at the east face and on the bench in the west end were conducted. Mounted on the frame of an old crawler wagon with the track removed from the four wheels, the jumbo consisted of a heavily constructed and substantially braced wooden platform, its

(Continued on next page)

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Grace Sweepers and Tank Car Heaters are built from engineering principles to do a job and DO IT RIGHT. The Grace Asphalt Heater (left) will give you pumping rates up to 250 GPM and temperatures up to 450°. The Grace Sweeper (below) is 2-way axle driven; completely adjustable; long life bristles; easy to operate.



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It has the capacity, fool-proof mechanism and durability to expedite over-the-road hauling and cut delivery costs.

The body illustrated is 24 feet long, with a capacity of 23 cubic yards. It is constructed of 10-gauge, high-resistance steel. The twin-cylinder telescopic hoist is capable of handling 22 tons of material.

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name MARION a symbol of quality covering a complete line of light, medium and heavy-duty under-body hoists, single and twin-cylinder telescopic hoists and the Hydropaka refuse and garbage compressor body.

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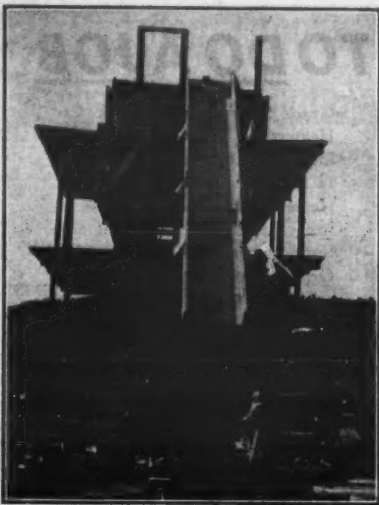


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A rear view of the jumbo under construction showing the wing sections on the three decks with temporary supports.

## Railroad Tunnel

(Continued from preceding page)

center section 16 feet long and 8 feet wide with three decks 7, 14, and 21 feet above ground with safe stairs connecting each level. The regular hitch for the tractor was used in moving the jumbo into and out of the tunnel.

From each of the three decks three wing sections extended on each side. These were attached to the center section by hinges and any or all could be dropped to a vertical position or raised to the horizontal where each of the eighteen sections was supported by 3½-inch pipes telescoped in 4-inch pipes bolted to the bottoms of the three levels of the center section. The smaller pipes were slid into the larger when the wing sections were lowered. Each wing was 5 feet wide so that when all were extended horizontally the jumbo furnished three working platforms 18 feet wide and 16 feet long, 7, 14, and 21 feet above the tunnel floor, known as cut deck, swing deck, and top deck, for workmen and the storage of drill steel and extra bits during drilling, dynamite and caps during loading, and bolts and timber during the timbering operations. At the forward end of the top deck a 3 x 6-foot wooden platform known as the crow's-nest was built 3 feet higher to give access

to the highest portions of the work.

A wooden chute led from the top deck to a point behind the jumbo high enough for a truck to back under its lower end and was used to deliver muck to the waiting trucks when top-center-drift and wall-plate-heading excavation was under way. This chute was also used to skid lagging, etc., from the truck to the top deck of the jumbo. A small air hoist did the lifting.

Electrical wiring to lights suitably placed on all decks could be plugged into a socket at the end of the light-and-power circuit and instantly disconnected when loading was started or when the jumbo was moved away from the working face. A 6-inch pipe with a flexible connection to the air line ran under the cut deck from back to front of the jumbo where it branched and furnished compressed air to two 6-inch double-strength vertical pipes. In addition to providing air for the operation of drills and the air hoist through three 1-inch outlets at each deck level, these pipes formed vertical columns to which were clamped

eight horizontal arms of 4-inch double-strength pipe to serve as movable supports for the drifters. These horizontal arms could be moved up and down the vertical posts to give the drills proper elevation, and the clamps by which the drills were attached to the arms could be adjusted to provide any angle or position for the drilling axis.

### Drilling at East Face

Drilling was done by eight Ingersoll-Rand DA35 3½-inch drifters, holes being started with 2⅜-inch bits and reduced in five steps of ⅛ inch to a minimum of 1⅞ inches. Four Ingersoll-Rand No. 55 jackhammers and a Chicago-Pneumatic stopper were also available for special uses if needed. Rock varied somewhat in hardness but each bit averaged 10 feet of hole. On the full-face operations in the east heading, 72 to 90 holes were drilled, depending on the depth of the round, with six cut holes drilled at an angle near the center of the face. These angular holes were, of course, somewhat deeper than the sur-

rounding straight holes, a 16-foot hole being drilled for the usual 14-foot depth of round. Of the six cut holes used, the two middle holes were fired with instantaneous detonators. The next four cut holes were primed with No. 1 delays, followed by No. 2 delays in the first relievers and Nos. 3 and 4 in the following relievers. Above and below this cut, Nos. 5, 6, 7, and 8 delays were loaded in a semicircle extending out to the sides of the bore, after which Nos. 9, 10, 11, and 12 delays were used to blast progressive circular sections from top and bottom, with No. 12 delays being loaded in the lower corner holes completing the round. In a wet section of ground the instantaneous detonators were eliminated to prevent misfires, and No. 1 used in their stead. Atlas Manasite delay caps were used for exploders, with 45 per cent Hercules Gelamite and 45 per cent Atlas Gelodyne as the blasting agents. Holes were so loaded that an average of 2½ pounds of explosive per cubic yard of rock was maintained.

(Continued on page 63)



"BULLDOZERS COME FIRST"—Just released by McGraw-Hill, this new 278-page book dramatically illustrates the prime importance of bulldozers and other construction equipment in winning the war against the Axis. Written by five of the country's ablest war correspondent editors, it's packed with facts and pictures gleaned from all the major battle areas.

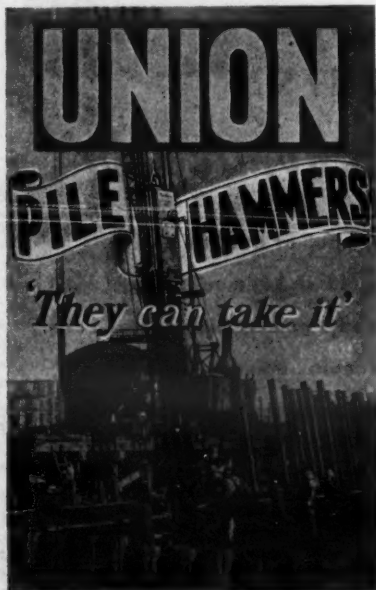
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While detailed figures cannot be revealed because of military censorship, 1944 was the biggest production year in dozer history. Moreover, again this year LaPlant-Choate built more dozers for the armed forces and essential civilian users than any other company in the industry. In addition to thousands of cable and hydraulic operated bulldozers and Pivot-dozer\*, LaPlant-Choate developed and built hundreds of highly specialized engineer units—including the now famous Tank-dozer, the Beach-dozer and the small airborne Calf-dozer. This record-breaking production, plus LaPlant-Choate's 21 years of "know-how" in dozer engineering is your best assurance of tomorrow's best buys in dozer equipment. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

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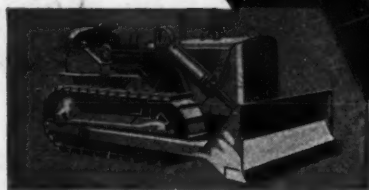
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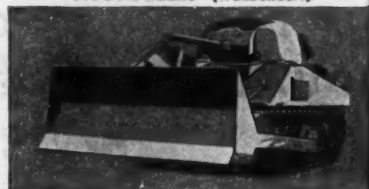
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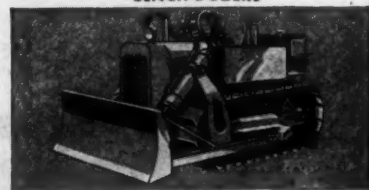
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Note the three stars—LaPlant-Choate is one of the few companies in the construction equipment industry to have won the Army-Navy "E" award of merit—four times in a row.





### Armco Bulletin Aids Post-War Road Design

Estimates of the American Road Builders' Association indicate that approximately \$16,500,000,000 in road work will be required after the war as a result of wartime reduction in highway maintenance and increased wartime traffic, particularly in industrial centers. Some suggestions and useful data for this post-war highway construction and improvement are contained in an attractive well illustrated 4-page folder which presents some of the problems confronting engineers and planners in the job

of bringing our highway systems up to peacetime condition, and shows how Armco corrugated metal pipe, pipe arches, Multiple Plate pipe, metal retaining walls, and other Armco products can contribute to this reconstruction work.

County and town officials, engineers, contractors, and others concerned with the improvement of roads after the war may secure copies of "Suggestions and Useful Data For Those Modern Roads You Are Planning" upon written request to the Armco Drainage Products Association, 385 Curtis St., Middletown, Ohio. Just mention this review.

### Marion Metal Products Purchases Defiance Steel

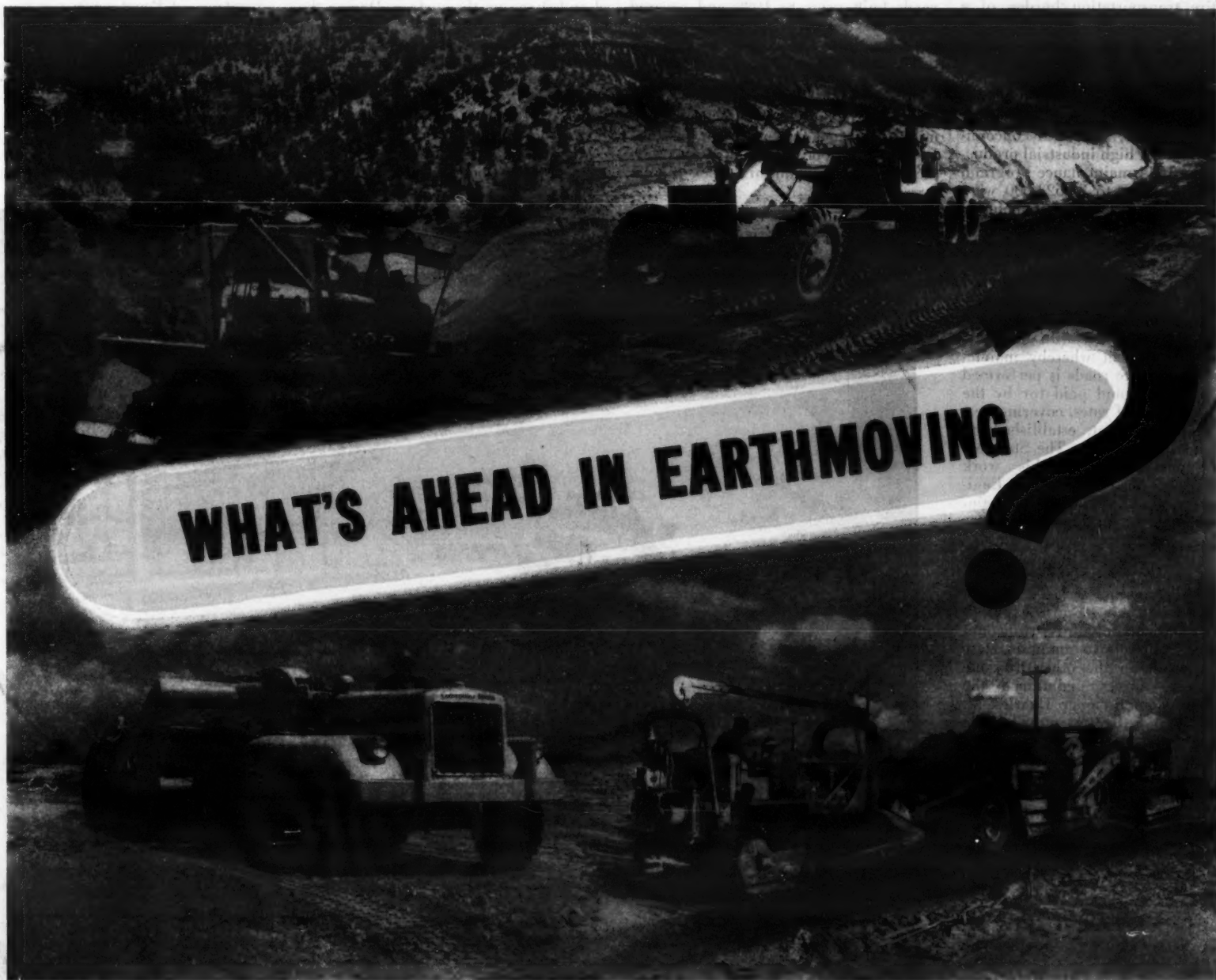
As part of a comprehensive expansion program, the Marion Metal Products Co., Marion, Ohio, manufacturer of truck bodies, hydraulic hoists and dump bodies, has bought the entire plant and assets of the Defiance Pressed Steel Co., also of Marion. The entire body and hoist division is now housed in the new plant, which will be devoted exclusively to the manufacture of a complete line of dump bodies and hydraulic hoists.

Officers of the company are: J. M. Strelitz, President; G. E. Herr, Vice

President and General Manager; L. E. Oberlander, Treasurer; J. L. Halberstein, Secretary; E. J. Shiefer, in charge of body sales and Assistant Treasurer; R. E. Craven, Chief Engineer; L. C. Dickerson, Works Manager; H. H. Jacobs and J. C. Gay, Field Engineers.

### Asst. Sales Mgr. Appointed

A. M. Buxton has recently been promoted to Assistant Sales Manager of The Cooper-Bessemer Corp., with headquarters at Mount Vernon, Ohio. Mr. Buxton has been with Cooper-Bessemer for 20 years.



**E**ARTHMOVERS are going to be busy. You are getting ready now for the big jobs that lie ahead when the fighting stops. And in any long-range planning, it's worth while to take a look at some records:

Long before the war, "Caterpillar" Diesel earthmoving equipment had won its reputation for stamina, economy and dependability. You know the number of "Caterpillar" *firsts* in the field—from the original track-type tractor and the introduction of

Diesel power to the operating ease of finger-tip control. You know, too, that sound engineering and thorough testing have always *proved* new "Caterpillar" developments before they appeared on the market. That's why "Caterpillar" customers have no orphan machines.

The thousands of "Caterpillar" Diesels serving our Armed Forces in this war offer added evidence that these sturdy machines rate foremost preference when you put in your

orders for new contracting equipment.

Soon the "Caterpillar" Diesels for civilian uses will once again be rolling off the production lines. Through "Caterpillar" quality, Diesel economy, correct design, all types of matched equipment to fit the job, and through top-notch dealer parts and mechanical services that help keep the job rolling—"Caterpillar" means *lowest costs on earth.*

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# Highway Maintenance Program in Michigan

**Current Program Largely By Counties and Contracts; \$3,623,000 Spent on 2,182 Miles of Roads in 1944**

✦ DESPITE the impact of war, 2,800 of the 9,400 miles of state trunk-line highways in Michigan are being maintained to carry approximately three-quarters of the entire transportation burden of a state that produces one-eighth of all war material in the country, according to the Michigan State Highway Department. Although passenger travel has slackened, these essential highways have been subjected to an increased traffic pounding from heavy trucks, a natural concomitant in a state of high industrial production. In the 1944 maintenance program, projects amounting to \$3,623,000 were completed by contractors and included concrete patching, bituminous-concrete resurfacing, non-skid surface treatments, and gravel surfacing on 2,182 miles of roads.

In the Michigan maintenance system, fifty-nine of the eighty-three counties in the state have contracts with the State Highway Department whereby maintenance work on state roads is performed by county forces, and paid for by the State on the basis of rates, covering personnel and equipment, established by county and state officials. The State exercises supervision over this work through inspection by the District Engineers to see that standards are maintained. In the remaining twenty-four counties, maintenance work is carried out directly by state road crews operating state-owned equipment based at state-owned shops and garages.

Two years ago this set-up was practically reversed, with only thirty-two counties having contracts to maintain state highways, while in the other fifty-one counties state forces maintained the trunk lines. Commissioner Charles M. Ziegler has found where a county has the organization and equipment to conform to the high and uniform standards of maintenance specifications required by the State Highway Department, considerable saving is effected and unnecessary duplication of effort is eliminated by contracting with the county for maintenance.

## Maintenance by Contractors

The Michigan State Highway Department may handle its own maintenance either with state forces or by letting contracts for the work. During 1944, forty-six contracts were awarded for road maintenance, including six for bituminous-concrete resurfacing, twelve for concrete patching, and twenty-eight for non-skid surface treatments; this does not include the many small contracts involved in the gravel-surfacing program. All contracts are handled by the Construction Division of the Michigan State Highway Department. Following is a summary of the type of maintenance, mileage, and cost:

Type of Maintenance	Mileage	Cost
Concrete patching	682	\$ 670,000
Bituminous-concrete resurfacing	50	803,000
Non-skid surface treatment	750	1,100,000
Gravel surfacing	700	1,050,000
<b>Total</b>	<b>2,182</b>	<b>\$3,623,000</b>

The concrete patching was done on roads built prior to 1928 and covered 682 miles on which worn and cracked areas ranging in size from a yard square to a section 200 feet long were cut out and replaced with plain concrete.

The six contracts for bituminous-concrete resurfacing were equivalent to 50 miles of 20-foot pavement, for in some instances 40-foot pavements were surfaced with this plant-mix black top, at

an average cost of \$8,000 per lane per mile. These contracts varied in length from 5 to 10 miles, as it was not considered economical to have a contractor move in and set up an asphalt plant for a job less than 5 miles long. One contract was only one mile in length, but it was eight lanes wide.

The 750 miles of non-skid surface treatment was the largest item in the maintenance program but this work progressed very rapidly at an average cost of \$1,500 per mile.

Contracts for the gravel-surfacing program included crushing, hauling and placing 1,000 tons per mile on 700 miles of roads in order to restore the lost gravel and shape up the surface. During the processing, the gravel was so crushed as to give a gradation of 100 per cent passing a 3/4-inch screen down to fines which would result in a dense stable road surface.

## Post-War Prospects

The Michigan State Highway Department now has completed plans for \$10,000,000 of post-war highway construction and can produce a like amount, should conditions warrant their use. If adequate engineering personnel could be obtained, a \$130,000,000 program of highway work could be produced on paper. Financing such a program is another story, however, with the revenue from the state gasoline tax having decreased \$15,000,000 a year since the war. Michigan has the plans but not the money right now for sustained highway construction in the post-war period.

## New Degreasing Bulletin

A new 4-page bulletin outlining the advantages of Penetone in removing oil and grease from machine parts or from wood floors, for cleaning garage windows, and even as a liquid soap, has recently been issued by The Penetone Co., Tenafly, N. J.

Copies of this bulletin giving full details regarding this safe non-toxic non-inflammable degreasing agent may be secured direct from the manufacturer.

**Spray Master**  
**PRESSURE DISTRIBUTOR**

When it comes to spraying Asphalt, Tar, Road Oils, or Emulsions, the "Spray Master" cuts the cost of operation.

The "Spray Master" is not an ordinary Pressure Distributor, but a designed spraying unit that incorporates years of research and actual road work under all conditions. Features found on the "Spray Master" are exclusive Littleford design and are offered as standard equipment.

"Spray Master" Distributors are made in Front or Rear Engine Mountings with Standard or Circulating Spray Bars up to 24 feet in width.

Be ready for the Big Road Building Program, have a "Spray Master" Pressure Distributor ready to do the job.

A typical view of the "Spray Master" at work spraying a Highway.

**LITTLEFORD**  
BLACK TOP ROAD MAINTENANCE EQUIPMENT  
SINCE 1900

**LITTLEFORD BROS., Inc.**  
485 E. Pearl St., Cincinnati, 2, Ohio

**Pledge Your Support**  
**BUY WAR SAVINGS BONDS AND STAMPS**





One of the Mississippi Wagons available in 9½, 10½ and 15-cubic-yard capacities.

## Big Hauling Wagons With Pneumatic Tires

Three models of Mississippi Wagons, each capable of carrying a maximum payload of 26,000 pounds, are now being produced by M-R-S Mfg. Co., Jackson, Miss. The three models, 75, 85, and 120, have heaped capacities of 9½, 10½, and 15 cubic yards respectively.

The first model is designed strictly for construction jobs, while the second is for topping contractors as well as for hauling gravel for state highways, counties, and others, while the larger size is designed for hauling light-weight materials. Each of these wagons is powered by a special International diesel wheel tractor of 72 hp.

Mounted on four pneumatic tires, the Mississippi Wagon has tractive ability for bad going at slow speed without paying the penalty of the pounding and surging of the heavy trailer on the tractor during high-speed hauling. Finger-tip control actuates the hydraulic cylinder between the rear of the tractor and the front of the trailer, transferring sufficient weight from the trailer to the tractor to secure the maximum tractive effort of the tractor. No part of the weight of the loaded trailer is on the tractor except when needed for traction purposes. The tractor can be quickly detached and used for other work, such as pulling sheep-foot rollers, rubber-tire rollers, etc.

Only 12 pounds of air is necessary in the four drive tires of the tractor, insuring good tractive effort after the load is dumped or when the tractor has been detached and is being used for other work.

Complete information regarding the Mississippi Wagon may be secured direct from the manufacturer by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

## Bridge-Type Changes Mark Army Progress

One paradox of the lightning drive of American armor across northern France has been the way American Engineers measure bridge-building "progress". Wherever and whenever they are able to replace a World War II steel bridge with a plain World War I timber bridge, the Engineers know that the Army is moving right along. This apparent progress "in reverse" is a clue to the indispensability of the two major steel bridge types, one British and one American, which have been the cutting edge in our thrust across the many streams of northern France.

The British-designed Bailey Bridge (C. & E. M., Sept., 1944, pg. 21) and the American-designed steel treadway bridge M-2, (C. & E. M., Nov., 1944, pg. 67) have been standard for emergency crossings by tanks and other heavy Army

vehicles. Many of these emergency crossings have been completed under fire, with the Engineers providing their own security against counterattacks by enemy patrols.

As soon as the "far shore" has been cleared of enemy activity, however, succeeding echelons of Engineers have constructed homely, but substantial, timber trestle bridges near the same sites. These permanent timber trestle bridges, requiring a day or two to complete, then take over the traffic load while the portable steel bridge moves forward again

to a new crossing.

Portability and speed of construction are features of both the Bailey and the steel treadway bridges. Training our own troops in the use of the Bailey, the Engineers have been giving, in practice, a pretty complete test of the Bailey's many uses. Masonry bridges destroyed by the retreating Germans have been patched together with Bailey sections into usable structures. One American Engineer unit even used French canal boats as giant pontoons to support a Bailey Bridge they threw across one stream.

The American Engineers' own bridge, the steel treadway M-2, was classed as "restricted" information until this past month because of its great value in the armored break-through across France.

Although taking a day or two to build instead of the four to five hours for the steel bridges, the old-fashioned timber trestle bridge has the advantage of being built from materials which can be made readily available at any site. Their standardized design is strikingly similar to

the military bridges built by Army Engineers over many of the same streams in World War I.

The constant "grasshopper" tactics of moving the Bailey and steel treadway bridges forward as the armies advance have made it possible for some Engineer companies to claim that parts of their bridges have now put American tanks over more than a hundred French streams.

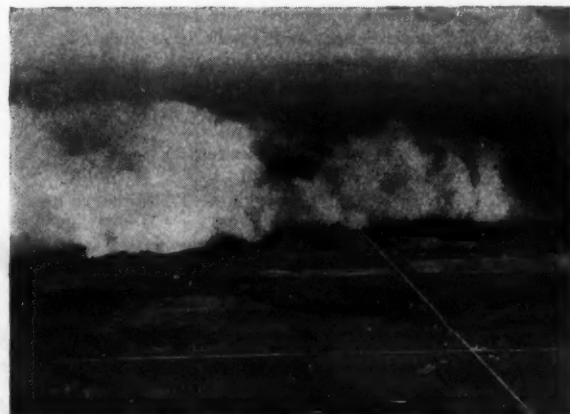
## Mobile Yard Crane For Highway Shops

A new catalog with 71 photographs and diagrams has been issued by Silent Hoist Winch & Crane Co., 841-877 63rd St., Brooklyn 20, N. Y., giving concise specifications of the Krane Kar, a mobile swing-boom crane for loading, unloading, and transporting material from 1 to 10 tons in any yard or shop. Copies of this 8½ x 11 hole-punched 24-page catalog will be sent promptly on request by the manufacturer to those mentioning this item.

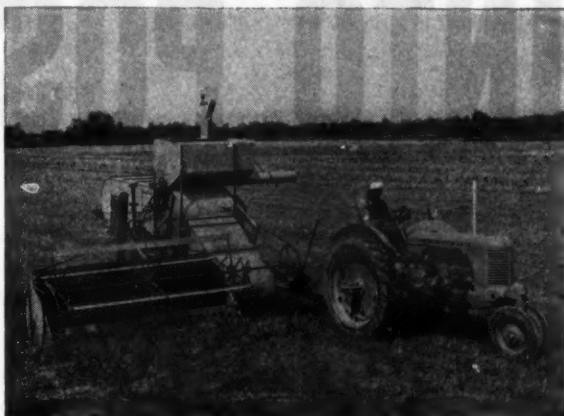
## RELIABLE IGNITION with WICO Magnetos



Pumping water to a purifier that makes any water drinkable is an important job on many a fighting front. The pump that does it cannot fail. So the Jaeger Machine Company which builds this equipment uses WICO magnetos.



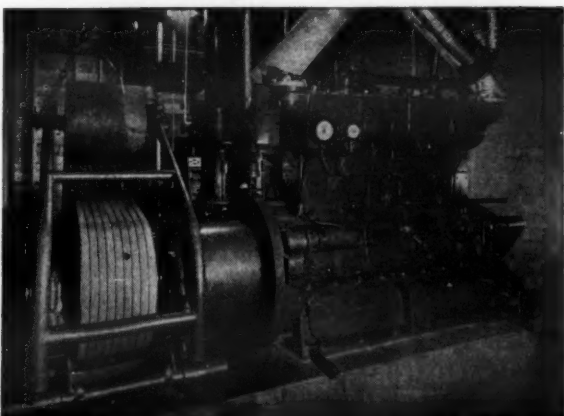
This smoke screen was laid by a smoke generator made by The Hail Company that is equipped, of course, with a WICO magneto. For getting smoke in the Axis' eyes is a job with which no chances can be taken. The portable generator that does it has a tough job.



This combine, by the J. I. Case Company, takes quite a beating. Not only must it operate for long hours in heat and dust, but it must start instantly after months laid up. So naturally enough it's equipped with a WICO magneto for trouble-free ignition.



John Deere Tractors have earned a reputation for being tough and reliable under all sorts of weather and field conditions. One of the reasons farmers swear by them is because they never need baby the ignition, for this tractor gets its spark from a WICO magneto.



The Fruit Industries Ltd., winery at Guast, California, has ice machinery powered by a big reliable engine by the Frazier Wright Company. It operates intermittently, day and night, and to be sure there'll be no ignition trouble it is equipped with a WICO magneto.

WICO pioneered mass production of quality magnetos, resulting in a great reduction in the cost of magneto ignition. This meant not only economy, but uniformity and simplicity. Wico engineers are ready to fit their product to your engine in such a way that the engine itself can be made more economically and will operate at its maximum efficiency. Wico Electric Company, West Springfield, Mass.

# WICO

**Carey Elastite**  
EXPANSION JOINT  
Standard in Concrete Construction for 31 Years  
ECONOMICAL and EFFICIENT  
Asphalt Joint  
Fiber Joint  
Sub-Grade Felt  
THE PHILIP CAREY MFG. CO.  
Dependable Products Since 1873  
LOCKLAND, CINCINNATI, OHIO



## Shoulders Widened On Access Highway

**Grading Contract Finished  
Near Seneca Lake, N. Y., on  
Road Serving Army-Navy;  
Thomas Fischette, Contractor**

PICTURESQUE Route 96-A along the eastern shore of Seneca, one of New York's Finger Lakes, has developed into an important military highway because of the war, and during 1944 the 3-foot shoulders have been widened to 10 feet for 15 miles of its length from Geneva to Willard, N. Y. Between the highway and the lake sprawls the great U. S. Naval Training Station at Sampson, while on the east side of the road and slightly farther north lies the Seneca Ordnance Depot of the U. S. Army. Between the Army and the Navy, Route 96-A took a lot of punishment from heavy traffic during the construction period of these two huge military establishments. Traffic congestion led, in 1942, to widening it 3 feet on each side, making a total paved width of 24 feet. The original concrete paving was 18 feet wide with 6-foot shoulders. A 2-inch plant-mix course of tar and aggregate was spread over both concrete and half the shoulders, requiring 22,000 tons of material, and leaving 3-foot dirt shoulders flanking the overall paved roadway width of 24 feet.

Late in 1943, a contract was awarded to Thomas Fischette of Clyde, N. Y., for \$112,498.50 to widen each shoulder 7 feet, making a 44-foot roadway comprised of the 24-foot existing pavement and two 10-foot dirt shoulders. Work was started in October, 1943, and the clearing and grubbing was completed before winter set in, putting an end to operations for the season. The clearing was no small item; between 600 and 700 trees ranging in diameter from 12 to 72 inches had to be removed. The smaller trees were uprooted from the clay soil by tying cables around them and pulling with a couple of Caterpillar tractors. The ground around the larger trees first had to be excavated by a Bay City No. 38 gas shovel with a  $\frac{5}{8}$ -yard bucket, or with a General gas shovel using a  $\frac{5}{8}$ -yard bucket, before the trees could be moved. The utility poles of the N. Y. Telephone Co. and the N. Y. Gas & Electric Co. were then moved back by their respective companies to the limits of the right-of-way.

### Extending Culverts

Work was resumed in the spring of 1944 by extending two 8 x 8-foot culverts and one 8 x 10-foot culvert about 10 feet on each side to pass under the widened shoulders. The existing culverts had flat roofs of 8-inch reinforced concrete but, because the critical material steel could not be used as reinforcing, the new culvert roofs were made 12 inches thick of plain concrete, either arched or peaked at the center. Ingersoll-Rand drills and an I-R compressor were used for breaking down the existing head walls in order to tie in the extensions. Truck-mixed concrete from the Ontario Sand & Gravel Co. at Oaks Corners, N. Y., about 20 miles from the end of the job, was used in the structures. Three Jaeger 2-inch pumps were available for unwatering the wooden concrete forms.

The concrete in the top slab of the culvert barrel and in the parapets was 1:2:3½ mix. The side walls, bottom of the barrel, wing walls and aprons were a 1:2:4 mix, while the wing-wall footings and cut-off walls were of 1:2½:5 mix. Other existing drainage structures on this road consisted of 16 and 20-inch-diameter cast-iron pipe. These were extended by using 15 and 21-inch-diam-

eter plain-concrete pipe respectively. A small Jaeger 1-bag concrete mixer was used to pour head walls for the pipe culverts.

### Grading

Excavation for the widening was done by the shovels mentioned and by bulldozers. Material was hauled out in three 5-yard trucks owned by the contractor and five rented trucks. There was an excess of excavation on the job, about 20,000 yards being wasted along state-owned lands on the northern extremity of the 33-mile-long lake around the western terminus of the Cayuga and Seneca canal. Another 5,000 yards was taken by the Navy to use for fill within the Sampson Training Station. Navy trucks and personnel hauled the material away after it was loaded by the contractor's shovels. The soil in this region consists of a 3 or 4-foot layer of clay resting on shale.

In the fill sections the shoulders were built up in 6-inch layers and rolled by a sheepsfoot tamping roller pulled by a

tractor. The soil was moist so no watering was necessary. Further compaction was secured by a Buffalo-Springfield 3-wheel 10-ton roller. Two Caterpillar power graders did the final grading. Shoulder slopes are 1 inch to the foot while the ditch section is 24¾ inches below the center-line grade. Back slopes are 1 on 4 wherever possible.

### Major Quantities

The major quantities involved in this \$112,498.50 grading and drainage-structure contract were:

Item	Amount
Excavation, unclassified	90,000 cu. yds.
Excavation, drainage structures	950 cu. yds.
Trimming shoulders	80,400 lin. ft.
Concrete pipe, plain, 15-inch	120 lin. ft.
Concrete pipe, plain, 21-inch	300 lin. ft.
Concrete, structural	785 cu. yds.

Exceptionally heavy traffic had to be maintained along this road during the widening operations. Traffic counts showed an average of 7,000 vehicles per day along this highway which is the main access road to the two military areas. Half the roadway width was always kept open.

The State Department of Public Works eventually will replace the original trees with 650 2-inch maples from the State nursery at Stormville, N. Y. The previous use of elms has been discarded because of the insidious prevalent Dutch elm disease.

### Personnel

Thirty-five men were employed on this contract which was finished in November, 1944. Thomas Fischette directed his own organization. William Robinson is District Engineer for District 3 of the New York State Department of Public Works at Syracuse, while Charles Fischer supervises all construction in the district, and H. H. Phillips was Resident Engineer on this project.

### Moves Cincinnati Office

The DeVilbiss Co. of Toledo, Ohio, maker of paint spraying equipment, has moved its Cincinnati District Sales Headquarters to 410 American Building, Central Parkway and Walnut Street.

# SWINGING On "Island" INTO POSITION

IN PERFECT coordination, two giant 75-ton capacity cranes slowly swing into position the 105-ton after-section of the flight deck island on the new aircraft carrier "Antietam"—an operation that requires maximum teamwork from crane operators and maximum efficiency from wire rope.

To get the most efficient service out of wire rope—on projects large and small—it must be thoroughly protected from the destructive effects of wear and weather. And to experienced contractors everywhere, this means lubrication with *Texaco Crater*.

*Texaco Crater* penetrates into and preserves the core of wire rope, preventing collapse. It seals each wire in a tough viscous film that reduces internal friction and wear, keeps out moisture, prevents corrosion. Keeps rope strong longer.

Used on open gears, *Texaco Crater* cushions load shocks, quiets noise, reduces wear. It doesn't ball up, channel or throw off, but clings to tooth surfaces, following through

from gear to gear, despite high pressures and temperatures, and peripheral speeds.

Texaco lubricants have proved so effective in service they are definitely preferred in many fields, a few of which are listed below.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States. The Texas Company, 135 East 42nd Street, New York 17, N. Y.

### THEY PREFER TEXACO

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.



# TEXACO

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON SUNDAY NIGHT



## Precast Blocks Used For Channel Riprap

(Continued from page 6)

and aging, the 1-ton blocks were loaded by the same crane, two at a time, onto Ford and Chevrolet trucks, which hauled four blocks each from the precasting yard to the point of use.

### Gravel Blanket

The sides and bottom of the graded and modified channel were lined with a 6-inch blanket of gravel, of the same grading as that used for concrete aggregate. It was shipped from the same commercial producers, and unloaded at the precasting yard by the same crane, the gravel for the blanket was hauled in dump trucks to the channel, approximately a mile away, dumped as conveniently as possible, then placed and shaped by a team and two laborers using a backfill board. Four additional laborers with hand shovels completed the final shaping and spreading of this gravel blanket.

### Placing Concrete Blocks

A Northwest crane with a 65-foot boom and grab hooks transferred the concrete blocks from the trucks to their final place on the bottom or sides of the channel. One man in the truck attached the grab hooks, while four men on the ground guided the precast blocks into their final position. Two men with shovels did the final touching up of the gravel blanket immediately under the block being placed. For placing blocks in positions inaccessible to the Northwest crane, a Mack truck with a 20-foot shear frame built of 4-inch pipe and equipped with a LeRoi-powered two-drum Clyde hoist was used. A Jaeger 4-inch centrifugal pump was able to control the ground water in the channel bottom, except after heavy rains, when additional pumping equipment had to be utilized to remove the storm water.

Placing of the completed blocks varied by wide limits, as many as 200 being placed on the best day, while the average production was probably in the neighborhood of 75 blocks.

### Quantities and Personnel

The major items in the work were:

Concrete riprap blocks	7,040 cu. yds.
Gravel blanket	2,629 cu. yds.

The contract for this work was awarded to the Fulton Construction Co. of Houston, Texas, by the Galveston District Office, U. S. Engineers, on its bid of \$94,464. Work was started on October 28, 1943, and was completed by October 31, 1944. E. A. Carpenter was Superintendent for the contractor, and Norman W. Brown was Resident Engineer in charge of this work for the U. S. Engineers.

### "Josh" Billings Takes New Goodrich Position

John C. "Josh" Billings has joined the Truck and Bus Tire Department of The B. F. Goodrich Co., Akron, Ohio, where he will handle sales of industrial and solid tires. Mr. Billings comes to this position from the Tire Requirements Department of the organization where he directed production control.

## Annual Federal Aid To Be \$500,000,000

(Continued from page 1)

with the exception of grade-crossing elimination projects where up to 50 per cent of the cost of right-of-way is allowed.

Other provisions in regard to grade-crossing projects restrict the amount of expenditures to 10 per cent of the sums apportioned to any state and further require contributions by the railways involving up to 10 per cent of the total cost. The liability of the railroad is to be determined by the Commissioner of Public Roads.

The basis for allocating funds for the Federal-Aid system and secondary roads is the formula of one-third area, one-third population, and one-third road mileage; for urban highways, the sole factor is population.

One of the omissions in the measure as finally approved was provision for a program of Flight-Strip construction by the Commissioner of Public Roads in cooperation with state highway departments. Declaring that the construction of Flight Strips should properly be under the exclusive jurisdiction of the CAA, the House, by amendment, struck out this section.

The effective date of the authorizations provided in the bill is the termination of the war emergency, with the further proviso that the funds may become available when Congress, by concurrent resolution, finds as a fact that the war emergency has been relieved to an extent which will justify proceeding with the highway program.

### Manganese Steel Pumps And Dredge Accessories

Manganese steel pumps and parts for suction dredges, featuring a special patented bearing unit which is lubricated separately from the sleeves, thus preventing contamination from the oil which may come from the sleeve bearings; manganese steel pipe-line fittings of high tensile strength, made in standard designs including elbows, pipe, offset pipes, nipples, reducers, flap valves, expansion joints, pipe flanges and hose nipples; Eagle Swintek suction screen chain-type nozzle ladders which, according to the manufacturer, assure maximum regular and uniform feed of solids to the suction nozzle; and sheaves, gears and rollers of manganese steel, reported to be highly resistant to wear and breakage, are described and illustrated in Bulletin No. 844D, made available by the American Manganese Steel Division of the American Brake Shoe Co., 398 E. 14th St., Chicago Heights, Ill.

The repair of worn or broken dredge equipment by welding is also covered, with special reference to the use of Amco nickel-manganese steel and Amco No. 459 hard-surfacing welding rods. Some cost data and photographs of equipment which has been restored in this manner are included.

Copies of Bulletin No. 844D will be sent upon request to the manufacturer.

### LeRoi Advances Sedgwick

The advancement of Norman M. Sedgwick from Assistant Manager of Compressor Sales to Sales Manager of that Division, succeeding Donald Heffron, who has resigned to take up another line of work, has been announced by LeRoi Co., Milwaukee, Wis., manufacturer of portable air compressors, internal-combustion engines, and engine-driven generator sets. Mr. Sedgwick has been active in compressor sales work for more than eight years and is well known among general contractors, government agencies, equipment distributor organizations, and compressor users in general.



## Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

METROPOLITAN OPERA BROADCASTS SATURDAY AFTERNOONS



## Encouraging Growths On Roadside Slopes

**Missouri Practice on Loess and Other Steep Slopes: Nature Will Carry On if Proper Plants Are Started**

By FRED R. BRUTO, Associate Engineer,  
Missouri State Highway Department

(Photos on page 4)

THE curtailment of roadside-development activities during the past few years has emphasized the importance and value of natural revegetation on Missouri roadsides. Wherever the maintenance man has left the roadside banks unmolested by scythe and brush hook, a profusion of native woody plants, weeds, and wild flowers has developed. In some instances, plants have invaded areas that were considered very difficult to vegetate artificially, such as the vertical cut slopes of loess soil found along the Missouri and Mississippi Rivers.

The treatment of loess soil in roadside development has always been considered a difficult problem, since this type of soil exhibits the phenomenon of standing in vertical cuts rather than remaining stabilized on slopes of 2 to 1 or 3 to 1. Attempts to stabilize such slopes with vegetation were usually unsuccessful. Slopes of 4 to 1, or less steep, were successfully stabilized and vegetated, but to reduce the slopes to this extent involved the movement of a great deal of soil at considerable expense. Where slopes were left as vertical cuts, it was felt impractical to attempt to cover such slopes with vegetation. Nature has now demonstrated that such vertical-faced cuts can be covered with many kinds of plants and vines.

The cover of plant growth on these slopes is highly desirable, both from the esthetic or landscape engineer's point of view which requires that roadsides be made more attractive, and from the maintenance engineer's point of view, which approves any means of controlling erosion and reducing maintenance costs.

Observation of plant growth on these loess cuts indicates that the work of vegetating by nature is progressive, requiring several years to bring about a complete coverage. Early stages involve the establishment of sumac, elm, black locust, and vines such as matrimony, bitter sweet, and wild grape. These plants seem to anchor themselves firmly and afford protection to a variety of weeds, wild flowers, and grasses which soon follow. Sweet clover, foxtail, partridge pea, small flowering sun flower, carpenter weed, various milk weeds, wild lettuce, wild carrot, plantain, ironweed, ragweed and morning glory are prominent among the many weeds and grasses present on these slopes.

The comparative freedom which these plants have had as the result of curtailed mowing and brush cutting on the part of maintenance crews has enabled the plants to carry on a normal existence, maturing their seed and extending their underground roots and runners so that a maximum of reproduction has resulted.

The development of this growth has



Grasses invading a vertical cut slope in loess along a Missouri highway.

seemingly not interfered with normal maintenance activities, such as snow removal, and since a desired objective in

roadside development has been attained it would seem good practice to encourage this function of nature wherever

possible.

The process of establishing this combination of woody plants and grasses on other sites and on newly constructed cut slopes can be hastened by the artificial introduction of many of these native plants by seeding and planting at the proper season and then giving such plants complete protection from man until a complete coverage is secured.

## Tremco Names Palm Sales Promotion Manager

A. C. Palm has been appointed Advertising and Sales Promotion Manager of The Tremco Mfg. Co. of Cleveland and The Tremco Mfg. Co. (Canada) Ltd., Toronto, maker of a complete line of paints, enamels and protective covering for maintenance and construction. Prior to his new post, Mr. Palm was a member of the staff of the Westinghouse Electric & Mfg. Co., Pittsburgh, Pa., and the Davey Compressor Co., Kent, Ohio. The appointment is in line with Tremco plans for post-war expansion.



### The Perfected Earthmover

Isaacson engineers have been improving hydraulic operation for years. Faster blade operation from a pump that is more efficient is but a sample. You gain both speed and power on blade operation. You will finish your jobs quicker.

Your tractor will last longer because Isaacson Trac-Dozer is "balanced." The blade hugs the tractor yet can be fully adjusted for tilt or angle.

The radiator tank and Isaacson Valve have eliminated most of the piping. Yes, it's streamlined and modern in every respect. You will be amazed at its operation. **Let your next hydraulic be an Isaacson Trac-Dozer.** There is none better.

Write today for our new booklet soon to be off the press and which will explain to you in detail this simplified hydraulic design.



 WHEELBARROW  
 CLEARING BLADE  
 SUPER-ROOPER  
 CABLE TRAC-DOZERS  
 TAMPING ROLLER  
 KARRY-BUGGY

 HYD. TRAC-DOZERS  
 WINCHHOIST  
 TRAC-CRANE  
 KARRY-WAGON  
 LOGGING ARCH  
 DUMP-SCRAPER



# ISAACSON

SEATTLE

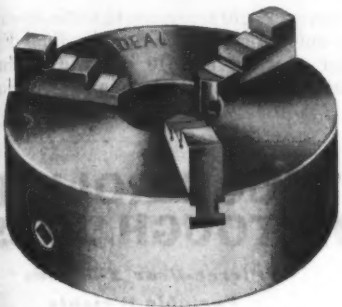
It's easier to lift, lower,  
push or pull the  
Simplex  
Way!

**Simplex**  
LEVER SCREW HYDRAULIC  
Jacks

for every  
construction purpose  
Awarded the Gold Medal for Safety  
Ask for Catalog 44

Templeton, Kenly & Co., Chicago 44, Ill.





The new Ideal Universal 3-jaw lathe chuck.

### New Precision-Made 3-Jaw Chuck, Adapter

A new Universal 3-jaw chuck which is reported to be inexpensive, yet precision-made to assure accurate turning, has been announced by the Ideal Commutator Dresser Co., 1366 Park Ave., Sycamore, Ill. The body is of high-grade fine-grain high-tensile-strength semi-steel. Ample resistance to shock, load, and unusual stress is provided by rib construction.

The scroll is made of alloy steel and has heavy proportions to assure true turning and long life. No expense has been spared in the special tooling required to make the threads of the scroll as accurate as possible, according to the manufacturer.

Two sets of jaws are furnished, one for internal and the other for external work. The jaws are made of specially treated alloy steel to give toughness and strength. If one jaw is damaged, it can be readily replaced. At present, this chuck is available in the 5-inch size only. A mounting adapter is furnished with each chuck so that it may be accurately fitted to the particular lathe on which it is to be used.

Complete information and prices of the new chuck may be secured by writing direct to the manufacturer and mentioning this illustrated item.

### Planning Falls Short Of National Program

Warning that post-war planning for public works thus far "falls far short of a national program", Major General Philip B. Fleming, Federal Works Administrator, recently told the Ohio Welfare Conference at Columbus that "if we are to have the business expansion necessary to provide something like full employment, we must also expand the public facilities and services which are prerequisite to business expansion".

General Fleming pointed out that at present two-thirds of all completed plans are accounted for by only five states, California, Michigan, Illinois, New York, and Ohio, and expressed the hope that the present Congress will make funds available to assist in the preparation of plans.

Title V of the War Mobilization and Reconversion Act authorizes the Federal Works Administrator to make loans or advances, without interest, from such funds as may be appropriated, to states and their political subdivisions to assist in plan preparation. Ninety per cent of the funds are to be allotted among the states in proportion to population, while 10 per cent may be allotted at the discretion of the Administrator. Such loans and advances must be repaid when construction of the projects so planned is begun, and it is specifically provided that the making of loans or advances shall not be construed as committing the Congress to participate in the financing of construction.

"Our plans for administering these loans and grants are going forward, although we do not yet know how large a sum will be available," General Fleming said. "We hope that an appropriation will be included in the first deficiency bill and become available before January 1."

"The success of the planning program will depend not only upon the manner in which we administer it, but upon the wholehearted cooperation of all public officials throughout the country. All of us can help to see that our counties and cities are prepared with their plans against a time of need."

### Off-the-Road Tires

A graphic portrayal of off-the-road tire design, manufacture, and performance is contained in a 24-page 10 1/2 x 13 1/2 brochure prepared by the Goodyear Tire & Rubber Co., Akron 16, Ohio. The many excellent photographs include a series depicting the principal steps in manufacturing a giant Earth Mover tire, which is later shown on difficult dirt-hauling jobs. The Sure Grip, the Hard Rock Lug, and other types of tires are also illustrated at work with the armed forces and in service on the home front. The explanatory text will be of interest to all users of off-the-road tires, particularly the section devoted to tire

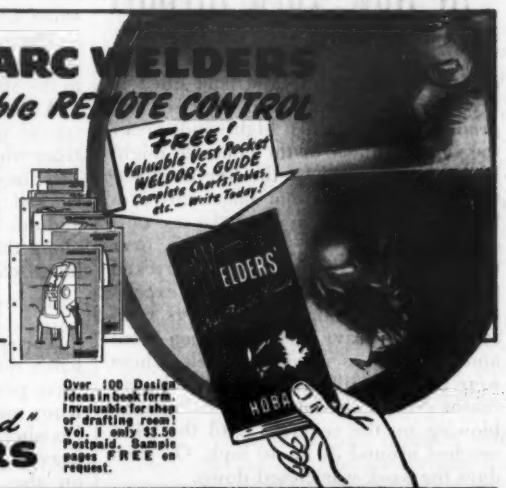
care which gives twelve specific recommendations for getting maximum service and longest life from your equipment tires.

Copies of this brochure "Goodyear on the Job" will be sent upon application to the company and mention of this review.

## HOBART ARC WELDERS

### Give You Adjustable REMOTE CONTROL

... eliminating the necessity of squirming out of "Close Quarters" ... returning to the machine to make proper adjustments of welding current and then squirming back to resume welding. Remote Control allows the operator to make adjustments quickly and easily right at the job ... thus saving considerable time and money. It will pay you to investigate "Simplified" Arc Welding and its time saving advantages! Hobart Bros. Co., Box CE-15, Troy, O.



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"Simplified"

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Plenty of compressed air—that's what is needed on this construction job. And plenty of air there is, furnished by the Schramm Air Compressor.

The Schramm portable engine driven compressors shown in this actual photograph are providing air and operating a pile driver.

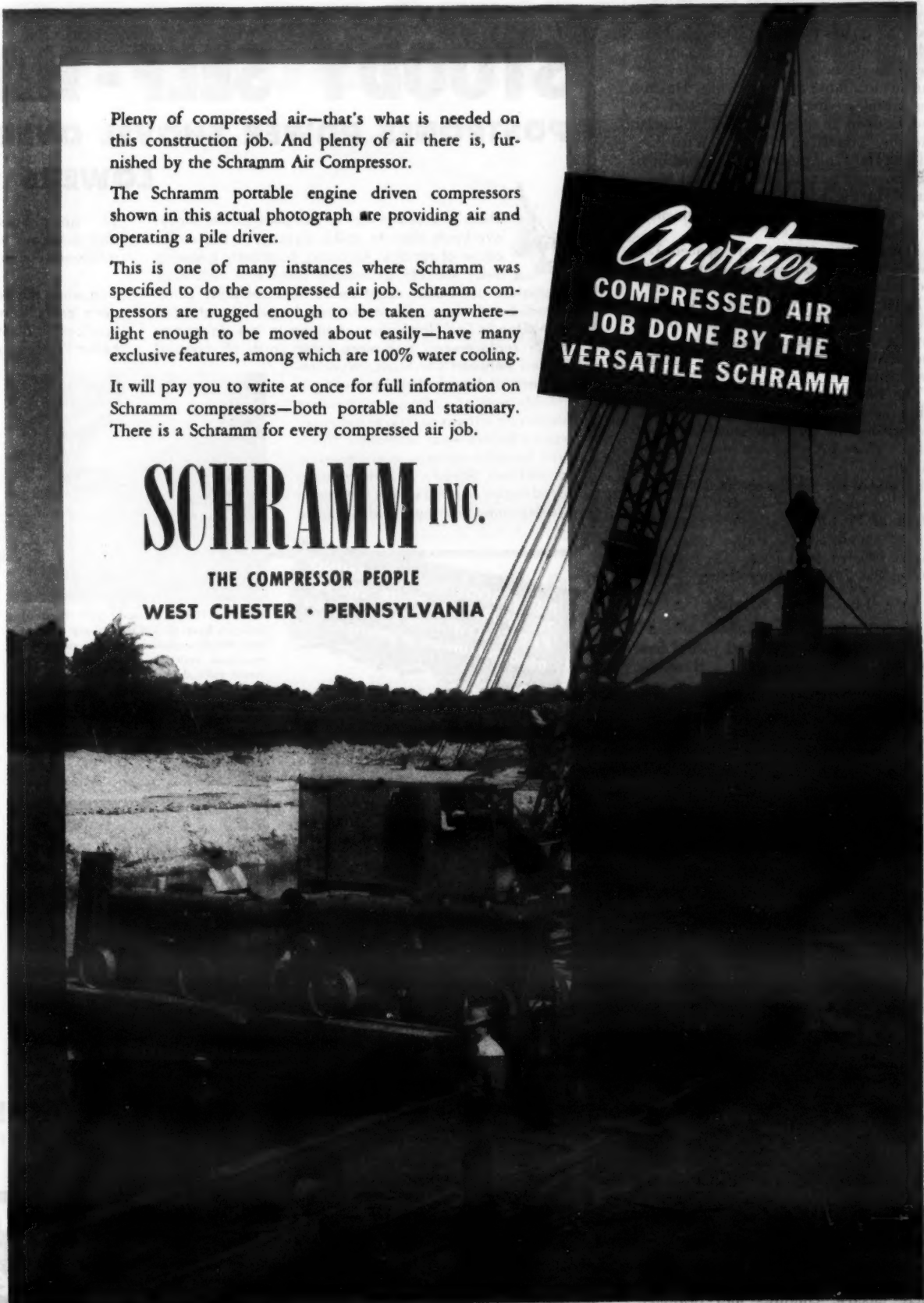
This is one of many instances where Schramm was specified to do the compressed air job. Schramm compressors are rugged enough to be taken anywhere—light enough to be moved about easily—have many exclusive features, among which are 100% water cooling.

It will pay you to write at once for full information on Schramm compressors—both portable and stationary. There is a Schramm for every compressed air job.

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THE COMPRESSOR PEOPLE  
WEST CHESTER • PENNSYLVANIA

Another  
COMPRESSED AIR  
JOB DONE BY THE  
VERSATILE SCHRAMM





## Runway Paving Begun At New York Airport

(Continued from page 2)

a single week-end the fine sand filled in between forms which had been set and graded. On days when high winds occur the surface finish of the concrete might be badly damaged by the fine sand settling on it if it were not sufficiently protected. The contractor tried the use of a complete cover, or "glass house", over the paving but the high winds wrecked the initial structure. Further experiments included thin plastic sheets reinforced with heavy string between them and mounted as movable panels. These were made in different shapes, and were reasonably successful in preventing sand blowing on the concrete until the wind reached around 30 to 40 mph. On such days the work was closed down.

### Expansion and Contraction Joints

Because of the lack of any extensive experience with expansion joints for slabs 12 inches thick, Jay Downer, Consulting Engineer for New York City on the Idlewild project, decided to try out various available types of joints. During the initial paving, Bethlehem Steel Co. and Godwin joints were used, followed later by American Steel & Wire Co. joints. The type or types to be selected for use when paving at the airport is resumed in the spring will be based on the ease of installation and effectiveness of the supports.

The expansion joints are spaced 120 feet, with the contraction joints at 40-foot intervals between. The former carry a 1-inch filler of granulated cork which is set 1 inch below the surface of the pavement. Three men set all of the joints ahead of the pavers which ran outside the forms.

The Bethlehem Steel Co. contraction joints used consist of 1 x 1-inch angles spot-welded to the dowels which were held in place by subgrade supports. The 3-inch slot for the poured contraction joint above the steel was cut by a saw-tooth bar carried on the rear of the Longitudinal Finisher and manipulated by two of the finishers, and a temporary 3-inch beveled steel plate was installed during the finishing operations.

### Mixing and Pouring

The 12-inch reinforced-concrete slabs, 12½ feet wide, were poured with a bottom course of 8 inches by a Ransome 34-E dual-drum paver and the top 4-inch course by a MultiFoote 34-E single drum paver. The batches were mixed 38 seconds in each drum of the dual-drum paver, and a total of 75 seconds in the single-drum paver. The batch yielded 1½ cubic yards or 36 cubic feet of concrete with a 2 to 2½-inch slump.

The Ransome is equipped with a 36-foot boom and the MultiFoote with a 32-foot boom which permitted easy pouring with the two pavers running in the same adjacent lane. The single-drum paver pouring the top 4-inch course occasionally delivered half-bucket loads to the slabs so that it would not overtake the first paver which was pouring twice the depth of concrete. Between the two courses, three men placed American Steel & Wire Co. welded steel mats made of No. 2 and No. 4 wire to give a 6 x 12-inch mesh. The pair of pavers, operating a single 8-hour shift, completed about 1,200 feet of slab per day during the autumn paving, due to the fact that most of the men in the crew had had little experience on this type of work. Toward the end of the autumn pouring, which ceased on November 17, the crews approached the 200 feet per hour which the contractor expected.

Another cause of the poor showing as far as speed was concerned was the necessity for leaving gaps in the paving where electric conduits and drainage

lines are to be installed later. At these points the finishing machines had to be moved across the gaps on windrows of sand topped with planks as no forms were set through these gaps. Similarly, when the pavers were operating on a slab already poured they had to be run across on planks when they came to gaps in the slab.

A Blaw-Knox paddle spreader quickly spread the concrete between the forms from where it was spotted by the paver. Two men, in addition to the operator, worked with this machine as puddlers and one of them used a Jackson vibrator along the sides and at the joints on the lower course only.

### Finishing and Curing

The spreader was followed by a Blaw-Knox double-screed finisher with which three puddlers worked. Behind the Blaw-Knox machine, a Koehring Longitudinal Finisher was operated with a fairly heavy roll of concrete against the float on the upgrade movement. This was necessary because the runways are de-

signed with a straight 1 per cent grade from the center line of the runway each way. The straight crown was checked with a wire at regular periods by one of the inspectors. The concrete seemed

to have a slight tendency to settle toward the outer form so the Longitudinal Finisher was operated to carry a slightly heavier roll of concrete against the float  
(Concluded on next page)

Write  
for  
Details



## A TOUGH ROLLER FOR TOUGH JOBS

Pierce-Bear 2-5 Tons  
Variable Weights

Engineered for economical operation where the going is tough. Compact, easy to operate. Narrow rear roller gives heavy-duty compression. Built-in water tank for wet rolling. Powered with Allis-Chalmers Industrial Heavy-duty Model "B" gasoline engine.

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### LOWERS OVERHEAD COSTS



There's no easier way to postpone power shovel overhauls than to strike directly at the major cause of repairs. Abrasion, constantly gnawing away the life of moving parts and enforcing premature overhauls, might never be completely eliminated; but its destructive action can be greatly retarded with **Stoody Self-Hardening**, resulting in less downtime, fewer replacements and more cubic yards of material resistance of Stoody Self-Hardening is double that of ordinary manganese steels and it takes so little to get maximum effective wear resistance. This is true because on large areas needing protection Stoody Self-Hardening need not be applied solidly but should be deposited in stringer beads spaced

1½" apart. Spacing saves 75% of the hard-facing metal and numerous hours of welding time, yet provides wear resistance comparable to solid deposits.

And when the Self-Hardening is worn away, your shovel parts are still in excellent shape... need only another application of Stoody Self-Hardening to restore them to better than new condition!



**BUCKET TEETH.** Stoody Self-Hardening stringers keep bucket teeth sharp and out to size. When applied parallel to tooth travel, maximum resistance to impact will result. Avoid solid deposits on teeth.



**BUCKET LIPS AND RUNNERS.** On large areas run single beads of Stoody Self-Hardening parallel to bucket travel when handling coarse materials; apply checkerboard patterns for maximum wear protection from loose earth.

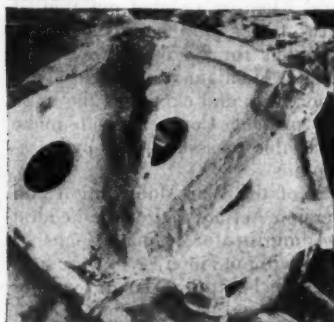
**PUT STOODY SELF-HARDENING TO WORK ON YOUR SHOVEL PARTS NOW! Here's where you need maximum protection:**



**TRACK PADS.** Prevent wear on pad lugs and maintain original size and shape with solid Stoody Self-Hardening deposits on inside lug faces and leading and trailing edges. Roller paths should be similarly hard-faced.



**TRACK ROLLERS.** A single layer of Stoody Self-Hardening keeps track rollers out to size almost indefinitely, reduces track slapping due to roller rim wear and keeps shovel weight off idlers and tumblers.



**DRIVE TUMBLERS AND IDLERS.** Lugs on drive tumblers mesh more accurately with track pad lugs when kept out to size with Stoody Self-Hardening. Wear is greatly reduced because of lower coefficient of friction. Idlers are maintained rounder and truer when working in fixed positions.

Many other equipment-saving applications with Stoody Self-Hardening are described in our booklets, "Stoody Specification Sheets" and "Hard-Facing, Industry's Weapon Against Wear"—write for free copies!

**STOODY COMPANY**  
1136 WEST SLAUSON AVE., WHITTIER, CALIFORNIA

## STOODY HARD-FACING ALLOYS

*Retard wear... Save Repair*



## Savin Has Contract For Three Runways

(Continued from preceding page)

when working upgrade.

Two hand finishers working behind the Longitudinal Finisher cut the traction-joint slots with the saw-tooth cutter and one of them used a 10-foot drag straight-edge and a 4-foot x 4-inch flat float, also with a long handle. Two men edged the slab and removed the steel caps at the expansion joints and put in 1-inch-square strips of wood as guides for the finishing. It is hoped to secure steel bars for this purpose later because the wood strips warp so quickly. All edging is done with 1/4-inch-radius tools.

The last finishing operation was a burlap drag pulled ahead by the two men who edged the slab and joints. Following this, New Haven cotton curing mats previously wet were placed on the slabs. In cool weather, they were put on about three hours after the finishing was completed. Immediately after placing, they were sprinkled, left on for six days, and wet daily, even in cool weather. No other curing method was used. Water for the pavers and for curing was furnished from the city water system through a 2 1/2-inch pipe with valves every 100 feet.

Because of the scarcity of burlap for jobs of this type there was some doubt that a sufficient number of mats could be secured to take care of this project. However, "an act of God" produced sufficient burlap to enable the contractor to have the mats manufactured. A barge carrying a considerable quantity of burlap for government use sank in the East River. After the burlap was salvaged, it was rejected by the government inspectors for the purpose for which it was intended and was thereafter purchased by the contractor and made up into the standard cotton-filled curing mats.

### Quantities

The quantities involved in Contract 7 for three reinforced-concrete runways at Idlewild, which was awarded to A. I. Savin Construction Co., of East Hartford, Conn., on its bid of \$2,203,945, are:

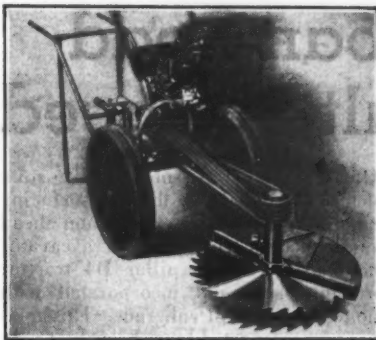
Grading	570,000 sq. yds.
Portland cement, high-early-strength	12,500 barrels
Natural cement	51,000 barrels
Portland cement, standard	110,000 barrels
Cement-concrete pavement	190,000 cu. yds.
Concrete, first class, 1:2:4	350 cu. yds.
Calcium chloride	50,000 lbs.

Metal reinforcement for concrete pavement	570,000 sq. yds.
Expansion joint material	48,800 lin. ft.
Bar reinforcement for structures	73,000 lbs.
Joint supports (a total of 140,000 or 209,000 joint supports will eventually be used, dependent on type)	16,000 units
Electrical conduit, 3-inch diameter	10,000 lin. ft.

This contract was awarded under an AA-3 priority which expires June 30, 1945, by John McKenzie, Commissioner, Department of Marine and Aviation, who is in charge of the construction and operation of New York City airports.

### Personnel

The design and construction of the Municipal Airport at Idlewild, Jamaica, Long Island, are under the direction of Jay Downer, Consulting Engineer, with Wharton Green, Associate Engineer, and E. J. Carrillo, Field Engineer. M. T. Decker is Chief of Design; R. B. Dillenback, special consultant in connection with paving methods; J. W. Davis, Concrete Technician in charge of paving; and Haller Engineering Associates, Inc., New York, are employed to make all tests of materials. P. P. Cook is Superintendent for A. I. Savin.



The new Lowther C-Saw.

## Speedy Mobile Saw For Timber Cutting

Cutting through a 24-inch hardwood tree in less than 3 minutes, and through 11 inches of spruce in 7 seconds are records reported by Harry A. Lowther Co., 141 W. Jackson Blvd., Chicago 4, Ill., for the new Lowther C-Saw. The constant-centered drive, a patented feature, insures belt alignment no matter what the angle of the saw. Four 112-inch V-belts connect two constant-centered drive pulleys. The wheels have needle bearing, and heavy-duty industrial-type dual pneumatic tires are available as optional equipment for easy rolling over loose, sandy or soft ground.

The saw is powered by a 6-hp air-cooled engine, and the whole is mounted on a tubular welded steel frame. The 30-inch blade with extra large teeth and extra deep gullets is operated at a speed of 1,150 rpm.

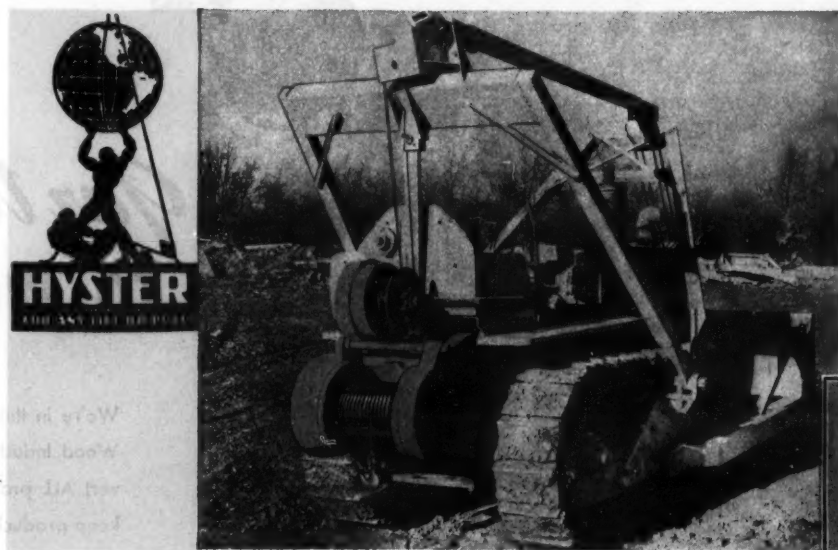
Full details of this saw together with prices may be obtained by writing the manufacturer and mentioning this text.

## Westinghouse Appointments

P. C. Smith, a member of the Westinghouse staff since 1921, has been named Assistant to the Manager of the Transportation & Generator Division of the Westinghouse Electric & Mfg. Co. At the same time J. S. Askey, G. L. Moses, and P. G. Lessman were appointed Section Engineers in the same department of the company.

# THOROUGHLY TESTED

## in the FIELD and NOW READY



## The New HYSTER D4 PCU AUXILIARY DRUM

A Dozer Cable Control Unit with Many Other Uses . . .

Here's GOOD NEWS for "Caterpillar" D4 tractor owners! HYSTER'S new PCU Auxiliary Drum is now available — ready to give your tractor its full working capacity. Combined with the powerful HYSTER D4 Winch, you can now have complete winch and cable control service.

### COMPACT . . . SMOOTH WORKING . . . EASY TO OPERATE

This new auxiliary drum was especially designed as a bulldozer power control unit. It is friction-driven, compact and smooth-working. A single, quick-acting control lever, convenient to the driver, gives finger-tip response to the blade. The drum has more cable capacity for longer reaches. A positive-working drum ratchet provides for boom topping; for holding loads suspended. A protected brake and clutch is removed from road dirt contact.

THERE IS ONLY ONE LUBRICATION FITTING on the entire unit. Driving mechanism is from winch transmission. Find out how many EXTRA towing and hoisting jobs your "Caterpillar" can do with this HYSTER combination. A new folder tells the story . . . Write for it.

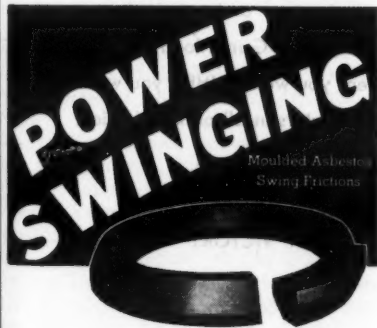
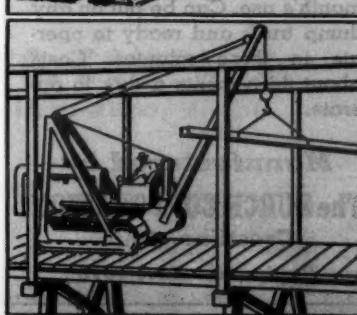
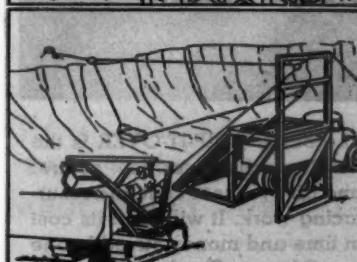
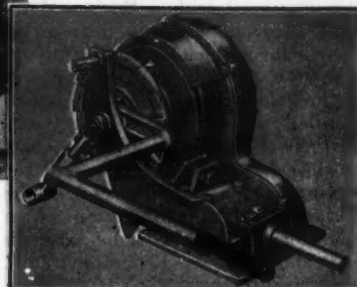
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TREMENDOUS POWER  
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They get the job done—save time—keep going.

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# Texas Suburban Road Rock-Asphalt Surfaced

**J. O. Mack Had Contract For 2-Mile Access Road; Backslope to Backslope Area Surface-Treated**

† ON an access road to relieve congestion in the vicinity of Kelly and Normoyle Fields near San Antonio, Texas, a contract, awarded to J. O. Mack, Jr., of Corpus Christi, called for the construction of 2 miles of rock-asphalt surface on full-width flexible base, with shoulders, ditches and both front and back slopes given a light double asphalt surface treatment to improve parking areas and surface drainage. The route extends from the east gate at Kelly Field, past the main gate at Normoyle Field, to connect with the Frio City road.

The cross section provides for a traveled way 22 feet wide with two 10-foot-wide sections on each side forming the front and back slopes of the shallow ditch necessary for drainage. The depth of ditch and the resulting slopes varied slightly with the drainage requirements. A considerable mileage of this type of cross section has already been constructed in suburban San Antonio and, according to R. A. Bossy, Assistant District Engineer, has proved to be economical and satisfactory.

## Grading and Subgrade Compaction

The old road was surfaced with rock asphalt on a "very flexible" pit-run gravel base which had proved wholly inadequate for the heavier modern traffic, resulting in extensive surface deterioration. Working sections 1,000 feet in length, an Austin-Western scarifier pulled by an Allis-Chalmers HD-10 tractor equipped with a Buckeye bulldozer plowed and windrowed the existing surfacing, which amounted to approximately 400 cubic yards. This was stockpiled close by, using a 6-cubic-yard LeTourneau scraper pulled by a Caterpillar Fifty and an 8-cubic-yard LeTourneau pulled by the HD-10 used for scarifying. This stockpiling cleared the road for the grading operation which was performed by the same scrapers and a Caterpillar No. 12 motor grader.

After grading was substantially complete on one section, the old surfacing material removed from the section ahead was loaded to trucks by a Traxcavator mounted on a Caterpillar D4 tractor, brought back, and incorporated with the top 3 inches of subgrade. This mixture was compacted by a sheepsfoot roller pulled by the HD-10 tractor after being sprinkled to approximately a 21 per cent moisture content with city water delivered in a 1,000-gallon tank mounted on a Ford truck and discharging by gravity. This transfer of old base and surface course onto the newly constructed subgrade was continued to the far end of the 2-mile job, with the material which had been stockpiled in the initial operation being used for compacted subgrade on the final section.

A small amount of old concrete pavement which was in place at the entrance to Normoyle Field was broken up, loaded out by the Traxcavator, and wasted.

## Flexible Base

The source of the material for the new flexible base was a pit located approximately 3 miles from the end of the job. Light stripping of the 6 to 10-inch overburden was performed by a Caterpillar D7 tractor with a LaPlant-Choate bulldozer, pushing the stripped material into a convenient gulley. A subcontract was let for the preliminary blasting of the pit, after which a 1-cubic-yard Northwest shovel, working an 8 to 12-foot face, loaded the pit-run gravel to two Ford trucks which delivered it to a grizzly constructed of railroad rails and reached by a ramp up which the trucks backed.

From the grizzly, a 22-inch conveyor belt fed the material to an Austin-Western crushing and screening plant with a 24 x 36-inch jaw crusher and a 3 x 6-foot shaker screen with 2-inch mesh.

From the discharge of the screening and crushing plant, a 50-foot Barber-Greene portable conveyor powered by a LeRoi engine transported the material to a 15-cubic-yard steel bin from which ten Ford and Chevrolet 4-cubic-yard trucks hauled the material to the point of use. The average production of flexible-base material was 400 cubic yards per 10-hour day.

The screen analysis of the crushed and screened gravel was as follows:

Retained on 2-inch screen	Per Cent
Retained on 3/4-inch screen	0
Retained on 40-mesh sieve	15.75
	80.25
The material passing the 40-mesh sieve met the following requirements:	
Liquid limit, not to exceed	35
Plasticity index not to exceed	12
Linear shrinkage not to exceed	7 per cent

The base material was dumped in windrows on the road at the rate of approximately 55 cubic yards per station to allow for 40 per cent compaction for each of the two 3-inch layers of a 6-inch compacted base on the full 42 (Concluded on page 48)

WHEN THE INDUSTRIAL RETURNS TO PEACE-TIME PRODUCTION



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We're in this war . . . right up to our ears. Gar Wood Industries, Inc. was among the first to convert ALL production into war work . . . and we'll keep producing more and more fighting equipment to back up our fighting men all over the world.

But we've an eye on the future, too. When Victory has been won and industry returns to normal peace-time production, Gar Wood will be prepared to serve customers and users better than ever before. Look to Gar Wood for the specialized equipment you want WHEN you want it. Branches and Distributors in all principal cities.

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SIX DIVISIONS . . . TO SERVE YOU BETTER THAN EVER BEFORE



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**GAR WOOD INDUSTRIES, INC.**

DETROIT 11, MICH. WORLD'S LARGEST MANUFACTURERS OF TRUCK AND TRAILER EQUIPMENT



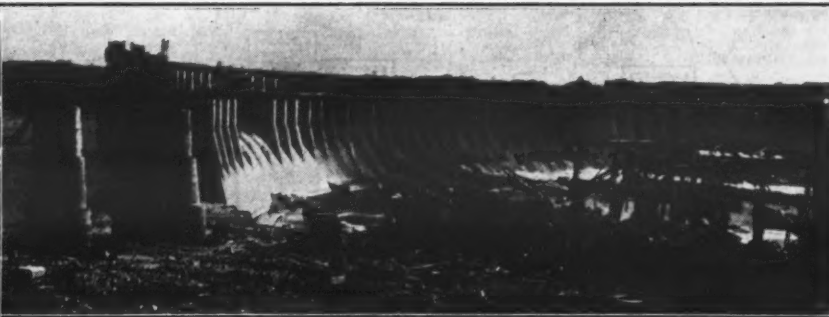
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TIME AND MONEY**



The Burch CHIP-IT-OVER is the ideal machine for ice control and also for seal coat and resurfacing work. It will earn its cost in time and money saved in one month's use. Can be put on any dump truck and ready to operate in three minutes. Costs about thirty cents a day to operate.

Manufactured by  
**The BURCH CORPORATION**  
Crestline, Ohio  
Equipment since 1875





Federal Works Agency Photos

A general view and close-up (at left) of the damage to the Dneiper Dam in Russia.

## Russians Rebuilding Famous Dneiper Dam

The great Dneiper Dam in southern Russia, destroyed in August, 1941, in the German blitzkrieg into the Ukraine, is now being rebuilt and it is expected that the project will be completed in 18 months. Major General Philip B. Fleming, Federal Works Administrator, who took the accompanying photographs while on assignment by the President to study Soviet reconstruction methods and programs, learned that the Dneiper Dam, reported blown up by the Russians as they were forced to retreat before the might of the German Army, was actually destroyed by the Nazi invaders. Russian engineers had short-circuited the generators and removed all vital equipment, but left the structure intact, evidently confident of their triumphant return to the Ukraine.

The first task in its reconstruction was to remove the large amount of wreckage and debris. Many women workers participated in this, and the work of reconstruction is being rushed in 11-hour shifts. Explosives were used to break up the debris, and tunnels were blasted through the dam to lower the upper pool and permit reconstruction to proceed.

The Dneiper Dam was the first completed project of the USSR's first Five-Year Plan in the industrial construction field, and was built by American engineers under the direction of the late Colonel Hugh L. Cooper of New York. The dam contained and controlled the flow of the Dneiper, the Ukraine's greatest river, and supplied power through its hydroelectric system to many industrialized centers and collective farms. By blocking the river, it also established an important inland navigation system.

## New Officers of Safety Construction Section

The new officers of the Construction Section of the National Safety Council, Chicago, Ill., for 1944-45, are as follows: General Chairman, G. O. Griffin, Safety Director, Dravo Corp., Pittsburgh, Pa.; Vice Chairman for Building Construction, Lloyd A. Blanchard, Chief, Safety & Accident Prevention Branch, Corps of Engineers, U. S. Army, Washington, D. C.; Vice Chairman for Heavy Construction, E. A. Blanpied, Safety Engineer, Kansas City Bridge Co., Kansas City, Mo.; Vice Chairman for Highway Construction, Lester D. Wise, Safety Director, Pennsylvania Department of Highways, Harrisburg, Pa.; and Secretary, Roy A. MacGregor, Executive Secretary, Constructors Associa-

tion of Western Pennsylvania, Pittsburgh, Pa.

The Advisory Committee is composed of W. A. Hazard, Engineer of Erection, Bethlehem Steel Co., Bethlehem, Pa., and R. J. Reigeluth, Treasurer, New Haven Trap Rock Co., New Haven, Conn. Edgar N. Goldstine, San Francisco, Calif., continues as News Letter Editor. Committee Chairmen include: Engi-

neering Committee Chairman, C. H. Black, Insurance Manager, Stone & Webster Engineering Corp., Boston, Mass.; Membership Committee Chairman, Robert L. Moore, Regional Civil Engineer, Liberty Mutual Insurance Co., Chicago, Ill.; Program Committee Chairman, F. J. Crandell, Civil Engineer, Liberty Mutual Insurance Co., Boston, Mass.; Statistics Committee Chairman, Harry J.

Kirk, Safety Director, Associated General Contractors of America, Inc., Washington, D. C.; Visual Education Committee Chairman, Thomas M. Webb, Safety Director, Bridgeport Brass Co., Bridgeport, Conn.

Mr. Hazard, Mr. Reigeluth and Mr. Goldstine are Past General Chairmen of the Construction Section.

## New Chief Engineer Is Named by Universal Atlas

The appointment of Richard A. Dittmar, Plant Manager of the Hudson, N. Y., plant, as Chief Engineer of the Universal Atlas Cement Co., New York, a U. S. Steel Corp. subsidiary, to succeed Sidney J. Robinson, retired, was recently announced. Raymond L. Walsh will be Assistant Chief Engineer.

Mr. Dittmar has been with the company 31 years, having started at the company's Hannibal, Mo., plant in 1913. His post at the Hudson plant will be filled by W. Scott Wilson, former Assistant Plant Manager.

# Missing Piece



Perhaps at an airstrip overseas, for that's where many of the new Huber Rollers have gone since Pearl Harbor. While we're proud of the manner in which they're handling their military assignments, we hope it won't be long until we're dropping them again into scenes like this.

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MFG. COMPANY

MARION, OHIO, U. S. A.

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COMMERCIAL HEAT TREATING  
SEASONING OF STEEL  
NITRIDING—A SPECIALTY

CADMIUM, ZINC, TIN AND  
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ALL KINDS OF GRINDING  
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## New Post-War Route Is Planned by Conn.

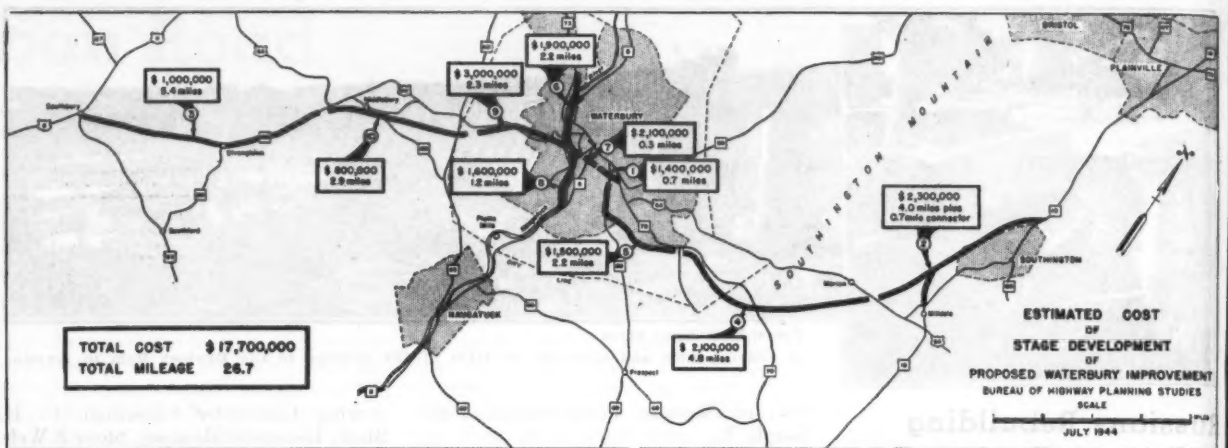
(Continued from page 6)

only deterrent to its adequate service as a modern trans-state highway. Connecting, as it does, the villages of Southbury, Woodbury, Watertown, Thomaston, Plymouth, and Terryville, it is largely part of the main street of these villages, with houses and stores fairly continuously fronting on the route. The beautiful old villages, with the houses and trees which line the existing route through them, make the development of a high-standard highway along its present location both undesirable and costly. To provide the type of east-west route required would mean the reconstruction of practically the entire route with by-passes around the several villages.

A direct route from Southbury to Watertown would involve the construction of a new road for the initial 3 miles to Strongtown, the reconstruction of Conn. 135 and U. S. 6A through Middlebury, and the construction of a limited-access highway through the city of Watertown. This route would continue easterly along Plank Road before turning northeast around Southington Mountain and, after crossing U. S. 6A east of Marion, would by-pass Southington on the west and terminate tentatively at Conn. 10 near the Southington-Plainville town line. This route, hereafter called the "Mid-City Route", would have as its primary problem the establishment of a satisfactory highway through the city of Watertown, in contrast to the numerous villages on U. S. 6. Middlebury, the only other built-up town traversed on this location, is somewhat more scattered than the villages along U. S. 6 and does not present the problem encountered there.

The construction of a by-pass to the south of Watertown could be started from Southford, utilizing Conn. 67 as a connection from Southbury. This route would continue from Southford approximately along the location of an abandoned railroad to cross the Naugatuck River near Platts Mills and, after continuing around the southern edge of the built-up portion of Watertown, would follow the same location as the Mid-City Route along Plank Road, around Southington Mountain and along the proposed by-pass west of Southington. This route would be almost entirely in undeveloped country.

Each of the three routes would permit development to high standards, with good alignment and grades limited to 5 per cent. However, because of the rugged nature of the country, heavy construction would be required. The development of either of the last two routes would eliminate the Southington Mountain grade, 1 mile of 10 per cent, which now constitutes both a deterrent to the expeditious movement of commercial vehicles and a considerable hazard. In fact, the hazard is recognized by truckers to the extent that all heavy down-grade movements are routed via Conn. 70 around the mountain, even though this requires considerable additional travel.



Connecticut State Highway Department

### How Traffic Would Be Served

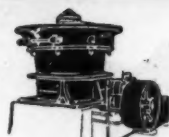
The measure of the service which each of the alternate improvements would provide can be evaluated by determining the extent to which the east-west traffic movements would be carried. The

U. S. 6 location is so situated with respect to Watertown that it could be expected to carry only through traffic (650 vehicles) bound from Southbury and beyond to east of Bristol, and such local traffic as would be generated along the route. The heavy traffic into Watertown

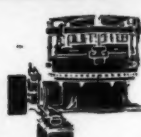
would not be benefited except to the extent that U. S. 6 is now used by such traffic in Southbury or east of Bristol.

The Southern By-Pass could be expected to serve well the above 650 through vehicles plus 170 vehicles to

(Concluded on next page)



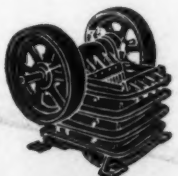
PRIMARY BREAKERS



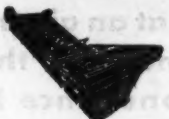
GYRASPHERE SECONDARY CRUSHERS



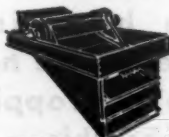
BELT AND BUCKET ELEVATORS



JAW CRUSHERS



SAND CLASSIFIERS



PULSATOR VIBRATING SCREENS



HEAVY DUTY FEEDERS

As an aggregate producer, you are facing the postwar prospect of rigid specifications, finer sizing requirements and far keener competition than ever before.

Is your plant and its equipment adequate to serve postwar construction market demands—at a profit?

Start your modernization plans now. Get ready for quick reconversion. Build in new plant efficiency with Telsmith Equipment.

By replacing worn out, obsolete or inadequate units with the right Telsmith machinery you can eliminate roundabout methods of

handling and bottle-necks in the flow of materials. Telsmith's greater flexibility insures wider product diversification. Telsmith's speedier, smoother, trouble-free operation and greater capacity will step up your production. And Telsmith's lower power and up-keep requirements will cut down your costs.

Telsmith expert engineering help is at your disposal, whether you plan to expand, modernize or build a complete new sand and gravel or rock crushing plant. Consultation involves no obligation. Get Bulletin E-34.

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FOR SAND, GRAVEL, ROCK CRUSHING PLANTS

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Rish Equipment Co.  
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Rish Equipment Co.  
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North Carolina Ept. Co.  
Raleigh and Charlotte 1, N.C.

Wilson-Weesner-Wilkinson Co.  
Knoxville 8, & Nashville 6, Tenn.



**Aeroil**  
ENGINE OIL

Employees and management are honored to announce that the Army-Navy "E" Award for excellence in war production was made on Thursday, December twenty-eighth, nineteen hundred and forty-four.

Aeroil Burner Co., Inc., West New York, N.J.  
CHICAGO 16 SAN FRANCISCO 7 DALLAS 1



## Traffic Studies Aid Planning New Route

(Continued from preceding page)

Meriden, Cheshire, etc., not served by U. S. 6 in its present location, and to a degree accommodate the east-west Waterbury terminal traffic. To the west, it is estimated the route would serve the 1,105 vehicles between Waterbury and Southbury and points beyond, although such traffic would be required to use 3 miles of the heavily traveled South Main Street to reach the central area of Waterbury. Neither the 992 vehicles a day from Woodbury to Waterbury nor the 3,800 vehicles from Middlebury to Waterbury would be served by the Southern By-Pass. To the east, the route would serve Waterbury traffic bound between Waterbury and points beyond Bristol and Milldale (5,149 vehicles). Here again, however, as for the traffic from the west into Waterbury, the by-pass route would not carry traffic to or near the center of the city. The by-pass is some 3 miles distant from the center of the city at the nearest point, so that the existing city streets would still have to carry this traffic to its ultimate destination, which is largely the central area of the city.

The Mid-City Route could be expected to serve well all of the through and Waterbury terminal traffic either of the other alternates would handle.

It is apparent that improvement along U. S. 6 or the Southern By-Pass would only partially solve the problem in the Waterbury area. Improvement of either of these alternates would have to be supplemented ultimately by the improvement in large part of the Mid-City Route. On the other hand, if the Mid-City Route is developed, the Southern By-Pass could be forgotten and U. S. 6 made adequate for the local traffic by minor improvements at comparatively small cost.

If either U. S. 6 or the Southern By-Pass could be developed to high standards at low cost and if such development would solve the most pressing traffic problems in the Waterbury area for some time to come, it is possible they might be considered as the initial step in the ultimate development of highway facilities in the area. However, neither of these conditions can be met. It is estimated that to construct the Southern By-Pass from Southford to its common point on the Mid-City Route would cost approximately \$3,000,000, and the provision of a high-standard improvement along the existing location of U. S. 6 would cost even more. At the same time, neither of these improvements could be expected to provide adequately for the great bulk of traffic which is moving in and out of Waterbury. From the standpoint of economy, it appears, therefore, that any large expenditure of funds should be used on the development of the Mid-City Route, and unnecessary expenditures in ultimate development be avoided.

### Section Through Waterbury

A very careful consideration of the needs of Waterbury itself and the plans of Waterbury municipal officials to establish municipal off-street parking areas to solve that problem in its business area led to the selection of a line in Waterbury through Bridge Street, to cost about \$8,000,000, just south of the central business district. This having been decided upon, a priority of need for the various sections of the 26.7-mile project was set up, as shown on the accompanying map.

### Conclusion

For the present, it has been concluded that definite decision as to the character and location of the facilities in Waterbury will be limited to the section from

Union Street in the city east along the Bridge Street line, around Southington Mountain, by-passing Southington, and terminating just north of that town. This comprises Sections 1, 5, 4, and 2 on the map on page 6, and will provide a continuous improvement from the center of Waterbury to the junction with Conn. 10, the College Highway, just north of Southington.

In addition, the Connecticut State Highway Department plans to build the Strongtown connection from Southbury, Section 3. These sections, with work in other parts of the state, will require all of the planning facilities of the Department for several years. The Bureau of Highway Planning Studies is confident that this early construction of Sections 3, 1, 5, 4, and 2 will fit into the ultimate route through Waterbury. The details of the latter and the north and south connections will be studied further in the post-war period. The Engineering Bureau now has survey parties working east from the center of Waterbury so that the difficult central section will be ad-

vanced in design to the maximum extent possible.

William J. Cox is Commissioner, Con-

necticut State Highway Department, and Roy E. Jorgensen is Director of the Bureau of Highway Planning Studies.

# WINPOWER

# ELECTRIC PLANTS

## DIESEL ELECTRIC PLANT

4500 Watts, 115 Volts, AC

### Model DI-5A

An extremely compact, durably built diesel plant, combining the economy of a diesel engine with a low purchase price. Enables the small power user to share in the sensational savings possible with safe, economical Diesel power.

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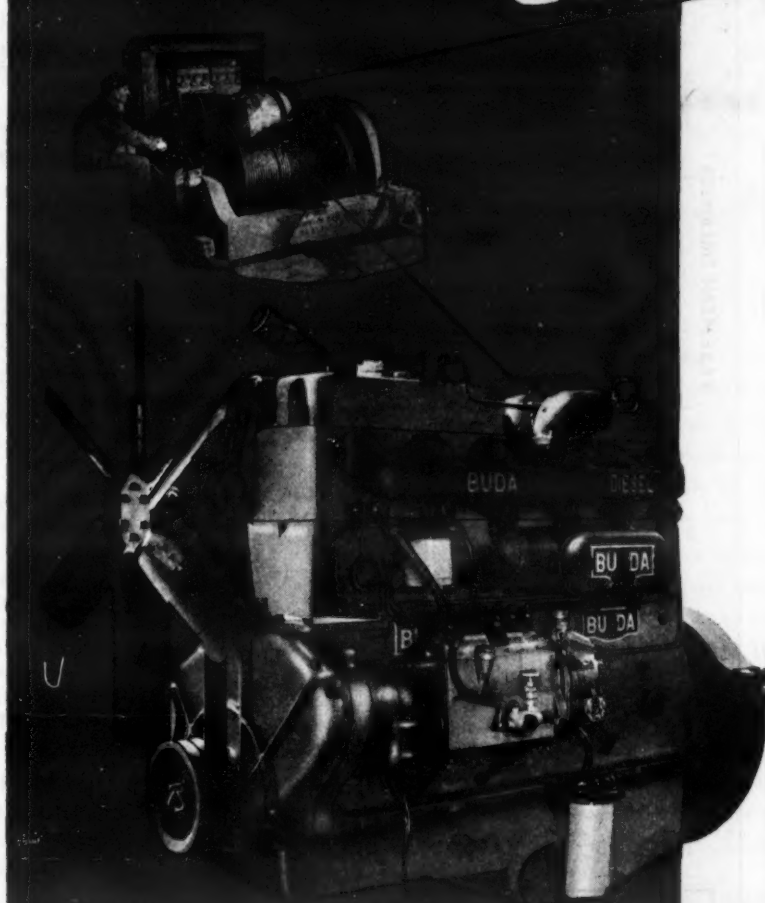


WIND POWER MFG. CO.,

NEWTON, IOWA

# LONG LIFE

## Low Pressure DIESEL



The smooth, steady flow of power from a BUDA "Low Pressure" Diesel means more than just good torque characteristics and peak performance . . . it means longer life as well. Cushioning the crushing impact of high-pressure combustion, changing the shock of a sharp explosion into a long, smooth power stroke, BUDA Low Pressure design adds years to the life of connecting rods — crankshaft bearings and other engine parts.

### BUDA Low-Pressure DIESELS

Prolonged "low-pressure" combustion delivers a smooth, steady power stroke that cuts vibration, saves parts.



Remember . . . BUDA powered means BETTER powered—Specify BUDA engines on the equipment you buy.

# BUDA

VEY (Chicago Suburb) ILLINOIS



# Hamburg, N. Y., Shops Have Many Functions

## Maintain Road Equipment For N. Y. State Dept. of Public Works District 5; Make and Repair Signs

† THE Hamburg, N. Y., shops of District 5 of the New York State Department of Public Works, with headquarters at Buffalo, N. Y., not only maintain 241 pieces of road equipment used in the four counties in the District, but also manufacture and recondition signs for nearly the entire state highway system. Located in Hamburg, Erie County, about 12 miles south of Buffalo, this three-building unit comprises a 70 x 200-foot garage and machine shop, a 60 x 120-foot blacksmith, carpenter and metal-working shop, and a 65 x 138-foot storage and paint shop. The three buildings are located one directly behind the other, with their long dimensions on a north-south axis.

General maintenance and repair of equipment takes place in the garage and machine shop which is located at the south end of the building group. This red-brick structure is 35 feet high, with a concrete floor. A roof of asphalt material is supported on steel trusses which also carry a dual-rail hand-operated overhead crane of 5-ton capacity. Equipment to be repaired is first cleaned with Oakite just outside the north or rear door, then enters the garage through that door and exits through an opposite door at the south end. These doors are the overhead rolling type, 12 feet wide x 15 feet high, and are easily opened by a manually operated crank.

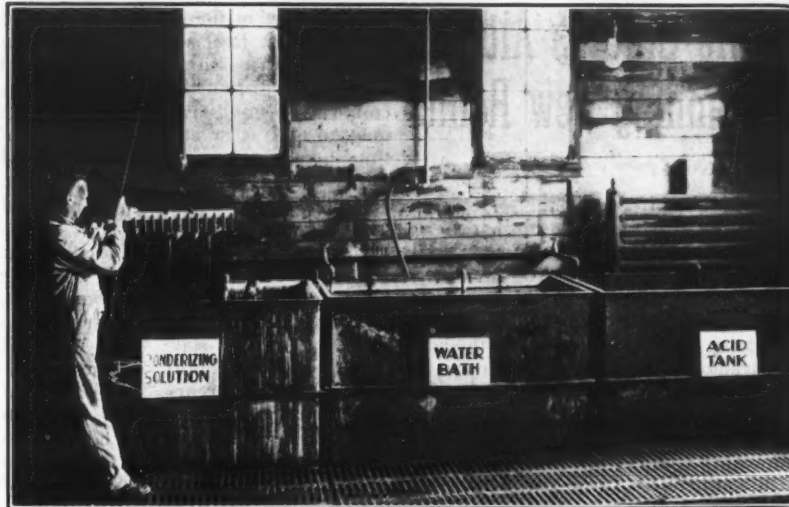
Windows 10 feet high run the length of the building on both sides, furnishing so much natural light that the fifty overhead electric lights are used only on dark days. A boiler located on the east side of the building, with an adjoining coal bin holding a car-load of soft coal, furnishes steam heat. A unit heater in the northwest corner of the garage circulates the warm air which is thermostat-controlled at a 68-degree temperature. The steam is conducted in a 4-inch-diameter pipe from the boiler to the blower unit which is placed 10 feet above the floor. The blower is 4 feet in diameter and is operated by a 5-hp G-E electric motor.

### Garage Equipment

Along the south and west walls are the mechanics' benches, 30 inches wide and 34 inches high, furnished with vises and compressed air outlets. An air line runs the length of the building with outlets 20 feet apart at each column. The mechanics furnish their own tools. The ten bench vises are garage equipment. In the floor, running the length of the building, are fourteen 4-inch vents,

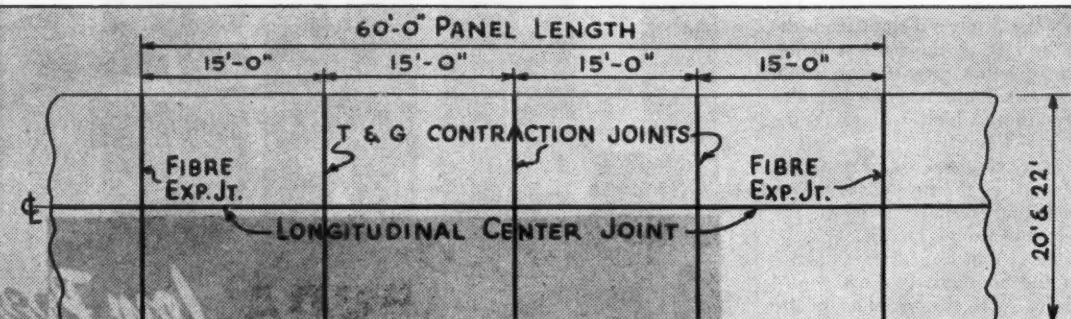
equally spaced, which lead into a 12-inch header line. By attaching a 2-inch flexible hose to the exhaust pipes of trucks and connecting the hose to one of these vents using a reducer, exhaust gases are removed, keeping the air in the garage free of carbon monoxide. A 12-inch Buffalo Forge exhaust fan is used on the header line to draw off the fumes.

In this section, where trucks and other large pieces of equipment are repaired, are located a Stiles brake liner, a small arbor press, four Sioux portable drills, and two Sioux portable grinders with flexible shafts used in cleaning carbon from engines. Sawdust is scattered on the floor to soak up oil and grease. Fire protection is supplied by Buffalo foam fire extinguishers.



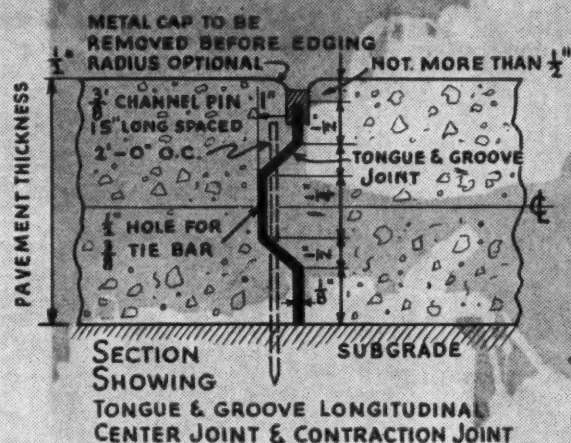
Part of the sign reconditioning procedure at the New York State Department of Public Works District 5 shops.

Along the north wall are located a Worthington compressor which supplies compressed air to the entire plant. (Continued on page 76)

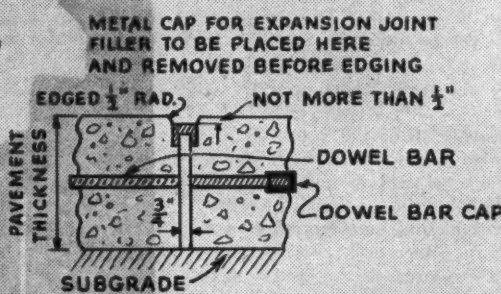


### PLAN OF PAVEMENT SHOWING JOINTS

NOTE:— LENGTH OF PANEL BETWEEN EXPANSION JOINTS OPTIONAL BUT CONTRACTIONS TO REMAIN 15' CENTERS



SECTION SHOWING TONGUE & GROOVE LONGITUDINAL CENTER JOINT & CONTRACTION JOINT



SECTION SHOWING FIBRE TRANSVERSE EXPANSION JOINT

NOTE:— ALL FIBRE EXPANSION JOINTS SHALL CONFORM TO AASHO SPEC. M-59-42

NOTE:— TONGUE & GROOVE JOINTS FOR LONGITUDINAL & CONTRACTION JOINTS SHALL BE ASPHALT MASTIC BOARD AS MANUFACTURED BY KEYSTONE ASPHALT PRODUCTS CO. OR EQUAL AS APPROVED (STEEL CENTER STRIP MAY BE MENTIONED IN SPECS. IF ENGINEERING AUTHORITY DEEMS NECESSARY)



CAP FOR ALL JOINTS #12 GA. STEEL

### PLAN OF PAVEMENT SHOWING JOINT LAYOUT

SUGGESTION NO. 1

KEYSTONE ASPHALT PRODUCTS CO. CHICAGO, ILL.

NOV. 9, 44. T.R.J.

- KEYSTONE ASPHALT MASTIC BOARD CENTER STRIP
- KEYSTONE MASTIC BOARD DUMMY JOINT
- KEYSTONE ASPHALT EXPANSION JOINTS
- KEYSTONE FIBRE EXPANSION JOINTS
- KEYSTONE CORK EXPANSION JOINTS
- INSTALLING CAP PLATES FOR CENTER STRIP
- STAKE PINS FOR CENTER STRIP
- INSTALLING CHANNELS FOR DUMMY JOINT
- KAPCO CONCRETE CURING COMPOUND
- JOINT SEALING COMPOUNDS AND CRACK FILLERS

## "One Stop" SERVICE

For convenience, economy and assurance that everything you need will be on the job when you want it, it will pay you to let Keystone furnish all your requirements...

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and  
WINCHES

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### N. E. Distributors Assn. Elects Officers at Meeting

At the annual meeting of the New England Equipment Distributors Association held at the Hotel Statler, Boston, on November 8, E. J. Crosby of Hedge & Mattheis Co., Boston, Mass., was elected President of the organization for the coming year. Other officers chosen were: Vice President, Clarence Willey of the Maine Truck-Tractor Co., Portland, Me., and Secretary, Frank Davis of the H. F. Davis Tractor Co., Boston, Mass. Jack Gorman of Tractors, Inc., Providence, R. I., was recommended for

nomination for Director of the Associated Equipment Distributors, to represent Region 1 in the national organization.

### Motor Attachments For Duff-Norton Jacks

Attachments for converting manually operated jacks to power jacks, making possible the use of 1½-inch to 2-inch drill-size portable shop motors, are described and illustrated in a 4-page folder issued by the Duff-Norton Mfg. Co., Box 1889, Pittsburgh 30, Pa. These attachments are available in two types, the

Duff and the Norton, and their respective applications are fully explained in the folder, which also contains illustrations of the attachments, the jacks with which each may be used, and the method of operation.

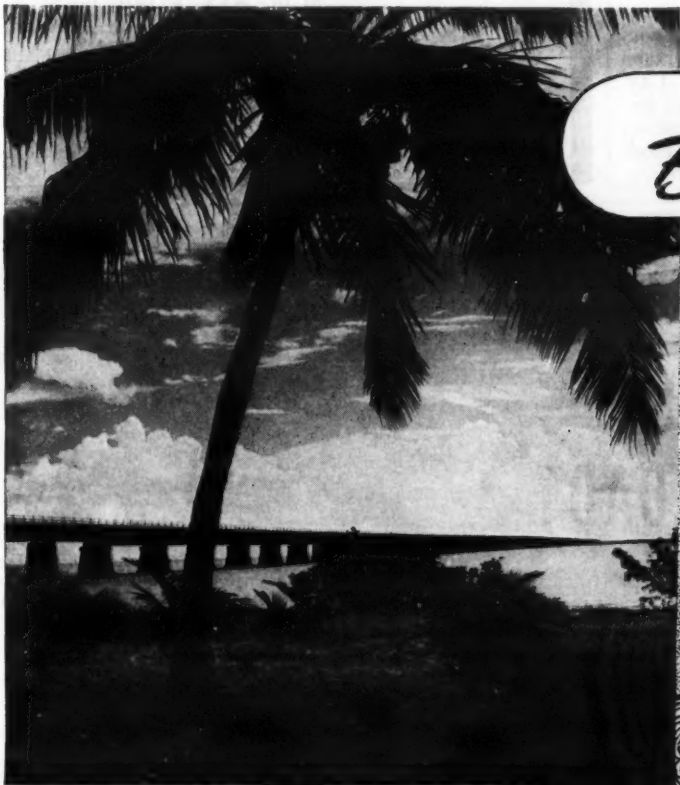
Quickly slipped in place and secured, these attachments are reported as safe, dependable and economical, permitting one-man operation and saving both time and labor in lifting or pulling jobs. The Duff type is for use with Duff-Norton governor-controlled jacks and is available in two models, temporary and permanent. The Norton motor attachment is designed for use with Duff-Norton

self-lowering speed-controlled jacks or similar units.

Copies of Bulletin DN-447 may be secured upon application to the manufacturer and mention of this item.

### Macwhyte Official Dies

Howard Gay, Secretary and Cost Department Manager of Macwhyte Co., Kenosha, Wis., manufacturer of wire rope, died on November 23, at the age of 51. Mr. Gay, who was a native of Meshoppen, Penna., joined the Macwhyte Co. in 1919, and was elected Secretary of the company in 1929.



Ewing Galloway Photo

AMERICA IS

*Built with Aggregate!*

*The Highway  
That goes  
To sea...*

Stretching apparently endlessly out to sea runs the Key West Highway Viaduct, one of the world's great engineering feats. Every foot of its more than one hundred and thirty miles is strong enough to withstand nature's most destructive forces because it's built primarily of aggregate.

On highways, airports, dams and other permanent structures which also require enormous quantities of aggregate, the difference of even a few cents per ton in material costs becomes highly important. Because of this, Iowa engineers are constantly striving to improve the Cedarapids line to provide every possible advantage for its users to produce better products at still lower cost.

No matter what kind of a job you are supplying material for you'll profit more by using Cedarapids equipment. Iowa is known everywhere as headquarters for aggregate producing and crushing equipment and asphalt plants.

**Cedarapids**

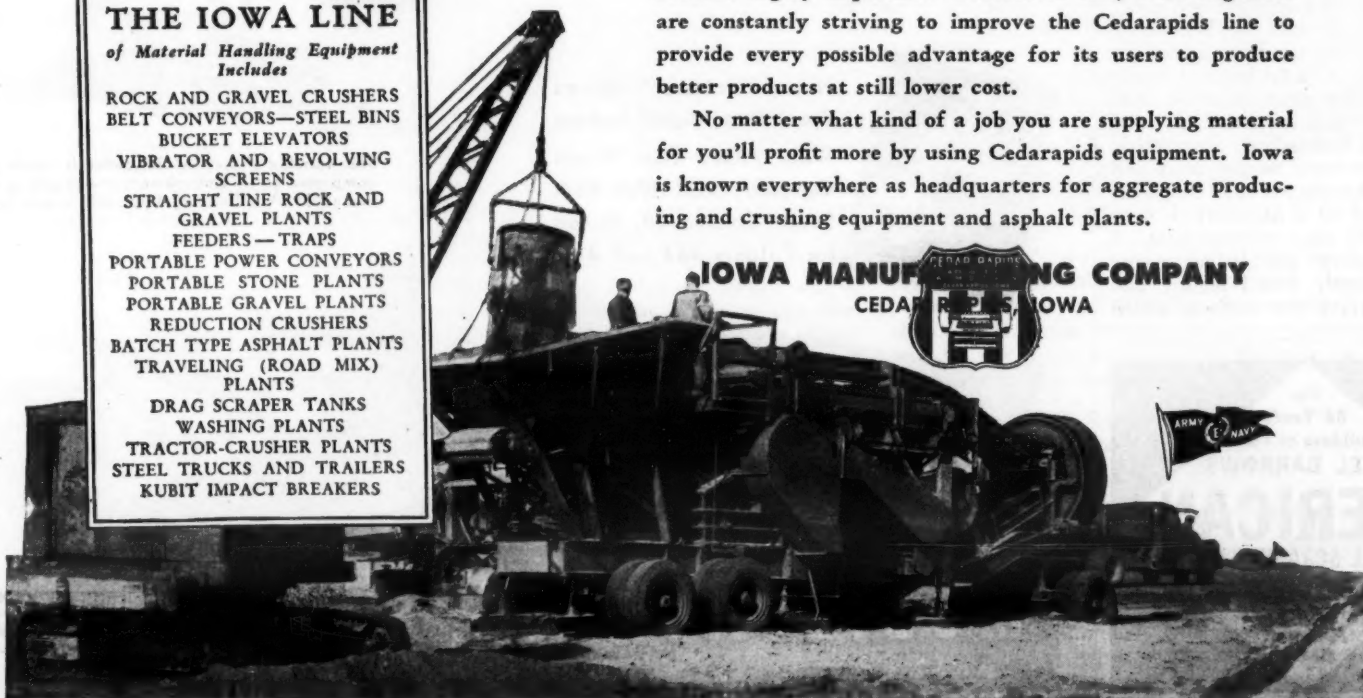
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### THE IOWA LINE

of Material Handling Equipment  
Includes

ROCK AND GRAVEL CRUSHERS  
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SCREENS  
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GRAVEL PLANTS  
FEEDERS—TRAPS  
PORTABLE POWER CONVEYORS  
PORTABLE STONE PLANTS  
PORTABLE GRAVEL PLANTS  
REDUCTION CRUSHERS  
BATCH TYPE ASPHALT PLANTS  
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PLANTS  
DRAG SCRAPER TANKS  
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KUBIT IMPACT BREAKERS

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## Mat Reconditioning On Montana Roads

**Oil Mat Used as Seal Coat to Repair Old Roads, or as Leveling Course for Armor Coat in District 8; Wood Curb**

✦ DISTRICT 8, Montana Highway Commission, with headquarters at Miles City, uses a procedure for minor repairs to oil-mat surfaces which is both effective and economical. It is of equal value as a minor repair to roads needing only a seal coat, for which it is a substitute with an even better riding surface; or as a preliminary treatment, to improve the existing profile, ahead of a more extensive seal or armor-coat job.

### Producing the Mat

When a section of bituminous-surface highway is designated for this treatment, maintenance or the contractor's forces place a windrow of aggregate along one side of the road. The grading of the material is not of paramount importance and is governed by the economics of its availability; however in general, it is not larger than 1/2-inch screen size. In some cases the sand reject pile from an earlier crushing operation, either contract or state force, is utilized. Natural gravel deposits in the district have an excess of fines so at any pit where aggregates have been produced there is an available supply of rejects passing a No. 4 sieve. When available, this material is most satisfactory. When material has to be produced for the operation, a portable trailer-mounted Cedarapids screening and crushing plant is used to produce aggregate with 100 per cent passing a 1/2-inch screen and at least 60 per cent passing a No. 4.

The windrowing of 125 to 200 cubic yards of the aggregates per mile, depending on the conditions of the old mat, may be a spare-time operation of the District forces. When the windrow is in place, a Standard Steel Works 1,200-gallon distributor applies 0.25 to 0.50 gallon of MC-3 or MC-2 per square yard at a temperature of about 170 degrees F to the surface of the existing mat. The quantity of asphalt used as well as the amount of aggregate placed in the windrow is dictated by the condition of the mat being improved, more asphalt being used if the surface is badly cracked and more aggregate if the profile or cross section has become non-uniform.

The work may be done the full width of the road surface if the shoulders are wide and stable enough to sustain traffic temporarily, but more often is performed on one half of the road at a time. As soon as the asphalt is in place, two motor graders go into action, one behind the other, blading the windrow across the freshly shot mat with the blades exerting considerable downward pressure, thus cutting off the high spots and filling in the cracks and depressions. Reestablishment of the crowned section is of first importance. Any excess aggregate, shot with additional oil if necessary, is used for widening or edge reinforcement. A 6-ton roller follows the blading, giving the mat a tightly sealed texture and greatly improving the surface, which

may be armor-coated, after curing, or utilized as the riding surface for another season.

### Timber Curb and Guard Rail

A timber curb is built at the edge of the traveled surface on the high fills approaching overpasses to aid in the control of slope erosion. For this procedure the guard-rail posts are placed and aligned and to them is nailed a string of 2 x 10-inch treated boards, their tops parallel to grade and 6 inches above it. The top rails are not placed on the guard posts until the blade mixing and placing of the mat has been completed, thus eliminating their being splashed with asphalt.

### Personnel

S. B. Sanders is the District Engineer in charge of all maintenance and construction for District 8 of the Montana Highway Commission at Miles City. Howard Holmes is State Highway Engineer and Ray Percy is Construction and Maintenance Engineer, with headquarters in the Central Office in Helena.

## U.S. Rubber Announces New Department Heads

It has been announced that Herman A. Everlien has been appointed General Sales Manager of the Mechanical Goods Division of the United States Rubber Co., New York City, and Walter F.

Spoerl has been made Merchandise Manager.

Both men have had long experience in the field, as both started out many years ago in the old Revere Rubber Co. in Chicago, which was later consolidated into the U. S. Rubber organization, and have been with the firm ever since.

# LA CROSSE

HEAVY DUTY MACHINERY TRAILERS  
FOR ALL PURPOSES

— Made by —

La Crosse Trailer & Equipment Company  
LA CROSSE - - - WISCONSIN

## WHICH OF THESE MATERIALS DO YOU LOAD?

IF you load any of these materials — GRAVEL  
EARTH • CRUSHED ROCK • SAND • ORE  
SNOW • COAL—look into the many merits of  
Athey MobiLoaders.

These fast-working loading tools, mounted on  
"Caterpillar" Diesel Tractors, are turning in  
outstanding records of production and low  
costs. Using the overhead loading principle,  
they're moving all kinds of materials faster,  
boosting output on every loading job.

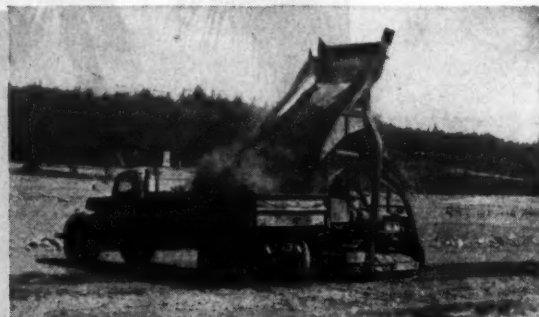
Ask your Athey "Caterpillar" Dealer about  
delivery on an Athey MobiLoader. In the  
meantime, write for new descriptive folders.



**New, Picture Folders  
On Athey MobiLoaders**  
Write Athey Truss Wheel  
Company, 5631 West 65th  
Street, Chicago 38, Illinois  
for Folders 444 and 445.

# Athey

## MOBILoaders



Loading rock into trucks on the Tacoma and Seattle, Washington Airport, this Athey MobiLoader speeds loading jobs for the Northwest Construction Company.



Sub-grading and loading earth at the rate of 90 cubic yards per hour with Athey MobiLoader. Owned by Columbia Bitulithic, Ltd., Vancouver, B. C.



This versatile Athey MobiLoader is loading from a compacted gravel embankment in a county quarry near Paragould, Ark. Loading 4 yd trucks in less than 2 min.



Crushed rock is quickly handled by this big-capacity Athey Model 8 MobiLoader on railroad grade building near Shelton, Washington for General Construction Co.

For  
68 Years  
Builders of Fine  
**WHEEL BARROWS:**  
**AMERICAN**  
STEEL SCRAPER CO.  
Sidney, Ohio  
Watch for  
Post-War  
Models





J. S. Bright, new Deputy Commissioner of the Public Roads Administration.

## PRA Appoints Bright Deputy Commissioner

Thomas H. MacDonald, Commissioner of Public Roads, has announced the appointment of J. S. Bright as Deputy Commissioner in charge of the Department of Construction and Maintenance of the Public Roads Administration, succeeding H. K. Bishop, now Special Consultant, who will retire when his services can be spared.

Mr. Bright brings to his new position an unusually varied experience in highway construction. Following graduation in engineering from the University of California, he was first engaged in railroad work, and then was employed by the San Bernardino County, California, Highway Department, where he was eventually appointed Chief Engineer.

With the initiation of the Federal-Aid highway program in 1917, Mr. Bright joined the staff of the Public Roads Administration, then the Bureau of Public Roads, and since that time has served in organizing and planning, and later in administering, large annual Federal-state construction programs. During the period 1919 to 1922, he was District Engineer in charge of Federal-Aid work and construction of roads in national forests in Colorado, Wyoming, and New Mexico, and subsequently was appointed Chief Construction Engineer at the Regional Headquarters in San Francisco, supervising Federal highway work in the six western districts covering the Rocky Mountain and Pacific Coast area.

Another interesting phase of Mr.

Bright's work was the organization and planning of the Federal-Aid road system in Hawaii, which is regarded as an important part of the island defenses, a work which he undertook in 1924 when Federal-Aid for highways was extended to that territory. In 1942 and 1943, he directed American and Canadian contractors, working under the Public Roads Administration, in the construction of the Alaska Highway.

## Georgia Letter Carriers Oppose Gas-Tax Diversion

Disapproval of the practice of diverting monies, now earmarked for highway construction after the war, to other purposes was expressed recently by the Rural Letter Carriers Association of Georgia. This organization recommended that "our officers exert every effort to have this injustice corrected" and further stipulated that gasoline tax money should be spent for the purpose for which it was collected. Mail men are definitely highway-conscious.

## Standards to Apply To Laminated Lumber

The Bureau of Standards has just announced that work is under way, under the auspices of the Central Committee on Lumber Standards, appointed by the U. S. Department of Commerce, to establish basic standards for glued laminated lumber products, similar to

the American Lumber Standards.

Development of glue laminating technique, which has been making rapid strides in the past decade, has been greatly accelerated by the needs of the war. Glued laminated lumber and its products are manufactured in substantial commercial volume and will undoubtedly have considerable use in post-war construction.

## MONDIE DROP and UPSET FORGINGS

### FOR CONSTRUCTION EQUIPMENT

Such as Dipper Teeth, Trencher Teeth, Gear Blanks, Levers, Tie Rods, Cranks, Crank Shafts, Special Shapes, etc. Forging weight range from 1 to 50 pounds.

*Inquiries given prompt attention by our Engineering Dept.*

## MONDIE FORGE COMPANY INC.

**10299 Berea Road                      Cleveland 2, Ohio**

*Yesterday*                      *Today*

They Go Together!

Baker Bulldozers and Allis-Chalmers Tractors

**BAKER**



Ever since the first Allis-Chalmers tractor was built over two decades ago, Baker hydraulic bulldozers have been designed and constructed for use with them. From that day to this, there has always been a Baker for every model Allis-Chalmers crawler tractor. Bakers are not adapted to—they're built specifically for—Allis-Chalmers tractors. Like salt and pepper, bacon and eggs, or bread and butter—they go together!

Baker engineering has kept pace with the progressive improvement of Allis-Chalmers tractors until today the modern Baker bulldozer is the ultimate

in serviceful, low cost, easy-to-maintain earth moving equipment. Now, as always, there is a Baker bulldozer and gradebuilder for every model of Allis-Chalmers crawler tractor—described in Bulletin 839. Bakers are sold exclusively by Allis-Chalmers tractor dealers everywhere.

**THE BAKER MFG. CO.**

585 Stanford Ave.

Springfield, Ill.

*If it Concerns Victory, it concerns us!*

**"STRAIGHT THROUGH" ASSEMBLY LINE - ALLIS-CHALMERS TO BAKER TO YOU!**

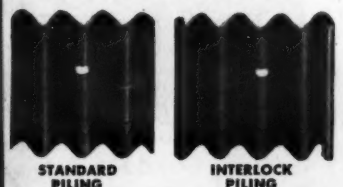
The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.

## Now CORRUGATED STEEL SHEET PILING ... is Easier To Get

Yes! Restrictions have been modified, priority ratings are lower, and you can again use the famous CORRUGATED Steel Sheet Piling, either standard or interlocking type, for the construction jobs you are figuring on.

CORRUGATED Steel Sheet Piling is strong, watertight, easy-to-handle, easy-to-transport and has unusually high salvage value . . . ALL IMPORTANT FEATURES.

Use it for bridges, dams, locks, sewage disposal plants, docks, levees, bulkheads, and any other big or little job where lightweight steel or wood piling is required. Send for specifications, catalog and priority facts today.



**CAINE STEEL CO.**  
1820 North Central Ave., Chicago 39, Ill.



## Asphalt Resurfacing Of Redwood Highway

(Continued from page 2)

plant. (See C. & E. M., December, 1944, page 21). They were so piped to a Cleaver-Brooks tank-car heater and a shop-built retort heater that asphalt from any or all of the tanks could be circulated through either of the two heaters. This incidentally provided 1,500 gallons of additional storage when unloading or delivering asphalt to the distributor.

An old Ford truck on which was mounted a Hobart arc welder, with racks for gas tanks and National torches and valves, provided portable welding and cutting facilities for job repair of equipment, and a Kohler 1.5-kw portable electric plant furnished light for night operations around the plant site.

### Laying the Armor Coat

At several convenient locations along the job, areas were provided for stockpiles of each of the three sizes of aggregates,  $\frac{3}{4}$  to  $\frac{3}{8}$ -inch,  $\frac{3}{8}$ -inch to No. 6, and  $\frac{1}{4}$ -inch to No. 10 crushed gravel, required for the armor-coat surfacing. To these storage areas a P & H 206 crane with a  $\frac{3}{4}$ -cubic-yard clamshell bucket was moved for loading the aggregates. The 4-cubic-yard bodies of the six Ford and Chevrolet trucks used in the armor-coating operation were loaded by the clamshell. One man shoveled into the corners and struck off the load to the proper amount, and the material was hauled to the point of application.

Asphalt heated to 375 to 400 degrees was hauled to the road from the storage tanks in the same distributor used for its application, a 1,560-gallon machine mounted on a Studebaker truck. It was equipped with a spray bar of the contractor's own design having a center section 8 feet long and two  $3\frac{1}{2}$ -foot end sections. These end sections can be turned into a vertical position by means of sliding ball joints for traveling, and are full circulating.

In order to hinder traffic as little as possible, the asphalt was applied in two lanes, 9 feet wide down one side of the road and 11 feet wide on the other. The irregular length of the sections of road being surfaced, the desire to finish the second lane as quickly as possible for reasons explained below, and the few hours per day during which the air temperature was above the specified 65-degree minimum made this operation very difficult to schedule and the resulting progress was slow.

The rather heavy application of asphalt, 0.35 to 0.40 gallon per square yard, specified for the second shot of the armor coat, even when applied at 400 degrees, cooled too rapidly to permit proper binding of the cover aggregate when the air temperature was at the minimum, and its use at lower temperatures was impractical. In order to expedite completion, a procedure was agreed upon which permitted faster progress. The crushed-rock base course was split into two equal spreads of 35 pounds per square yard and the penetration shot of asphalt was divided into 0.16 gallon per square yard for the first course and 0.20 gallon per square yard, thus making the armor coat four, instead of three, courses. By doing this it was found that satisfactory penetration and cover of the aggregate could be obtained.

Following the adoption of this policy, the sequence of operations was as follows:

Application of 0.10 to 0.15 gallon asphalt per square yard  
Spreading of 35 pounds of  $\frac{3}{4}$  to  $\frac{3}{8}$ -inch crushed gravel  
Application of 0.16 gallon of asphalt penetration  
Spreading of 35 pounds of  $\frac{3}{4}$  to  $\frac{3}{8}$ -inch crushed gravel  
Application of 0.20 gallon asphalt penetration  
Spreading of 30 pounds of  $\frac{3}{4}$  to No. 6 crushed gravel  
Application of 0.15 to 0.20 gallon of asphalt  
Spreading of 12 to 16 pounds of  $\frac{1}{4}$  to No. 10 crushed gravel

The gravel in 4-cubic-yard loads arrived at the point of spreading in trucks each of which had an 8-foot Hanrahan

Spreadwell spreader box attached at the rear. Immediately following the application of asphalt to a 9-foot-wide lane, the gravel trucks backed down the road to avoid running on the uncovered asphalt, spreading the gravel 8 feet wide from the edge in, thus leaving a 1-foot strip uncovered in the center. The gravel was uniformly fed to the spreader box by two men riding the truck, and two men with hand brooms followed closely, correcting any minor inequalities in the spread. Immediately behind them a truck pulled a light drag made of 2-inch steel angles in the form of a letter "M" with longitudinal tie angles to give it rigidity. This dragging was promptly followed by two Buffalo-Springfield tandem rollers, weighing 6 and 8 tons respectively, to key in the gravel.

Traffic, led by a pilot car which drivers were not permitted to pass, followed the rollers through so that the second lane, 11 feet wide, could be shot with asphalt before the exposed 1-foot strip left from the first shot had cooled too much. The application of gravel to an 8-foot width

on the other side of the road followed the distributor closely, leaving 4 feet of uncovered asphalt in the center of the road, 3 feet remaining from the 11-foot application and 1 foot from the initial 9-foot strip. This 4-foot strip was immediately covered by gravel by the same type of spreader box, both ends being blocked to confine the spread to a width of only 4 feet, and brooming and rolling completed the course.

### Major Item

The major items of this contract included the following:

Scarify and reshape existing base	249 stas.
Apply water, contractor to develop source	796 M-gals.
Imported base, gravel	9,498 cu. yds.
Liquid asphalt, MC-2 prime coat	51 tons
Sand for blotting, prime coat	349 cu. yds.
Paving asphalt, 200 to 300-penetration, armor coat	142 tons
Screenings	1,977 cu. yds.

The total amount of the contract was \$52,435.94, with 65 working days allowed for its completion.

### Personnel

The contract for this maintenance

work on U. S. 101 in northern California was awarded to Marshall M. Hanrahan, Redwood City, Calif., in July, 1943. The placing and priming of the base and the production of surface aggregates were done during 1943 and the surface applied during the summer of 1944. C. L. McFarland was Superintendent on bituminous operations for the contractor. For the California Division of Highways, the work was under the direction of A. M. Nash, District Engineer of District No. 1, with headquarters at Eureka, and H. O. Ragan was Resident Engineer.

### Penn Elected Director Of Tyson Bearing Corp.

Hamilton O. Penn of New York City has been elected a Director of the Tyson Bearing Corp., Massillon, Ohio. Mr. Penn is well known in the field, being head of the H. O. Penn Machinery Co., New York, distributor of construction machinery, and Executive Vice President of the Associated Equipment Distributors of America.

*Every type of time-saving and labor-saving equipment*

For 45 years, CP has been a familiar symbol to contractors... an identifying mark of efficient, dependable air compressors... low air consumption and low maintenance rock drills, concrete vibrators, and play spades... backfill and more.

**CP PORTABLE COMPRESSORS**

Hundreds in world-wide use have proved the exceptional smoothness, economy and sturdiness of CP's 500-ft. Caterpillar Diesel driven, two-stage, air-cooled portable compressor. CP features include: gradual speed regulation, Simplate Valves, pressure lubrication, self-adjusting clutch, etc. Other Chicago Pneumatic Portable Compressors are available in sizes of 60 c.f.m. to 315 c.f.m., Diesel or gasoline powered.

**CP 365-RP PNEUMATIC WRENCH**

Speedy, powerful. CP 365-RP (Impact Type) Wrenches remove or apply nuts, bolts, lag screws, studs, in a fraction of the time required to do either job by hand. Capacity: 1 1/4" bolt size. There are five other CP wrenches for bolts, nuts, studs, etc., from 3/8" up to 1 1/4" bolt size.

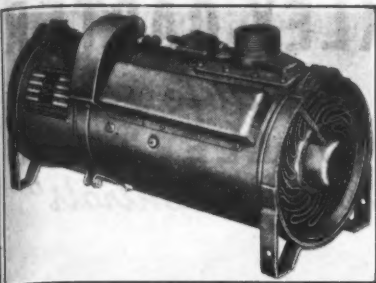
**CP-325 PNEUMATIC VIBRATOR**

For reinforced concrete under 3" slump. Powerful, easily handled by one man, the CP-325 is ideal for walls and columns over 15" thick, for heavy floor and roof slabs and for appurtenances on heavy construction projects.

**CP CLASS "Y" 'PACKAGE TYPE' COMPRESSOR**

Shipped intact, all ready for external connections. CP Type Y Compressor is easily and quickly installed. Requires only minimum floor space. Available with built-in or direct-coupled motors or with V-belt drive, in capacities of 500 c.f.m. to 900 c.f.m. at 80 to 125 pounds pressure; other sizes are available for higher and lower pressures.





A Herman Nelson vehicle heater, particularly adaptable to snow-removal equipment or cabs of trucks during the winter.

nounced a new type of gasoline-burning heater known as the Model AT-1000 vehicle heater. It can be used for heating vehicles and other ground equipment, as a space heater for personnel comfort, or as a preheater for warming up various types of machinery preparatory to operation in very cold weather.

Although the heat output is 20,000 Btu, the unit measures only 15 inches long x 6 1/8 inches in diameter and weighs 17 pounds. Powered by an integrally designed fan and electric motor, it is claimed that a new low-pressure principle of combustion results in a minimum of current drain on the battery of the vehicle in which it is installed.

Installation requires only a supply of fuel and a source of electricity, as the operation is fully automatic, being remotely controlled by a simple on-off switch. The manufacturer points out that the heater fan can also be operated independently to provide unheated ventilated air when desired.

Models are available for 6, 12 and 24 volts dc. While present production is de-

voted to various special applications for the armed forces, these heaters will be available for civilian use as soon as wartime restrictions are removed. Complete information may be secured direct from the manufacturer by mentioning this item.

### Tractor Service Tools

The Owatonna Tool Co., of Owatonna, Minn., has recently published a 20-page catalog describing, with diagrams and illustrations, its line of essential service tools for Caterpillar tractors. The tools illustrated are a part of the OTC Pulling Set, which includes various sizes of pullers, push-pullers, adaptors and attachments, and operate successfully on all makes and models of tractors, in addition to doing service jobs on heavy trucks, power shovels, draglines and other heavy equipment.

Copies of this catalog may be obtained by writing direct to the company for bulletin No. CT. 25 and mentioning CONTRACTORS AND ENGINEERS MONTHLY.

## Monroe County Roads Maintained by Towns

(Continued from page 8)

gravel from a local pit was then spread uniformly over the surface, using town trucks for the transport. This was covered with a binder of tar, RT-4, at the rate of 0.5 gallon to the square yard. Pressure distributors from the Barrett Co. in Rochester, 15 miles away, handled the bituminous material. A stone spreader then covered the tar with a thin layer of No. 1 stone.

No. 2 stone, passing a 1-inch but retained on a 1/2-inch screen, was next windrowed along one side of the road in sufficient quantity to cover the entire width of the road to a depth of 3 inches. The road grader then moved this windrow and distributed it over half the road surface to a depth of 6 inches. An application of tar, RT-5, at the rate of 1 gallon to the square yard, followed. The material was then mixed thoroughly by the blade on the power grader, spread out over the full width of the road, and rolled by a 10-ton 3-wheel Buffalo-Springfield roller. A seal coat of 0.5 gallon of RT-5 to the square yard was next applied and covered with No. 1A stone, passing a 1/4-inch but retained on a 3/8-inch screen. After rolling, the road, which had been closed, was opened to traffic. The stone for all this road reconstruction came from LeRoy, N. Y.

### Surface Treatment

Still another type of road reconstruction in common use in Monroe County is surface treatment, of which a mile-long section on Redman Road in the town of Hamlin is a good example. This 18-foot old penetration macadam pavement first received an application of 0.33 gallon of RC-5 asphalt to the square yard. This was covered with No. 1 stone chips, 20 pounds to the square yard, or about one stone deep as placed by a mechanical spreader. The surface was then rolled by a 10-ton roller and opened to traffic. One half the width of the road was treated at a time so there was no interference with traffic. The following morning the surface was gone over with a drag broom to distribute any loose stone and then given a final rolling.

### Asphalt Distributors Now Take to the Air

The story has just come out about Etnyre Black-Topper bituminous distributors which have been made into airborne units for quick delivery to the South Pacific battlefronts. It is not easy to think of a full-sized distributor being delivered by plane, but it was done.

U. S. Engineer Corps officers, knowing of the critical need of bituminous distributors to speed the construction of airfields and access roads at the battlefront area, experimented with air delivery. In cooperation with Etnyre engineers, the problem was finally solved by assembling each complete distributor, delivering it to the out-bound cargo base, disassembling it sufficiently to fit into three plane loads, then reassembling it when it reached its destination.

Once the solution had been reached, fast action was demanded, with delivery of twenty-six units scheduled in less than three weeks. In that time Etnyre not only made the distributors, but also published a complete instruction booklet to show cargo-plane loaders how to disassemble and reassemble the distributors.

It hardly seems conceivable now, but in post-war days it may be that your bituminous distributor may be delivered from E. D. Etnyre & Co., Oregon, Ill., to your home town or to the job by air express as a result of this wartime experience.



Catalog No. 600, "CP Construction Equipment", contains essential data concerning the latest CP equipment. Write for your copy.



#### CP-116 SHEETING DRIVER

Essentially the popular CP-116 Demolition Tool with a special front head for driving sheet piling. CP Sheet-Driving Driver has only one moving part, the piston, which strikes a fast powerful blow. Does not "broom" — sheeting can be used over and over.



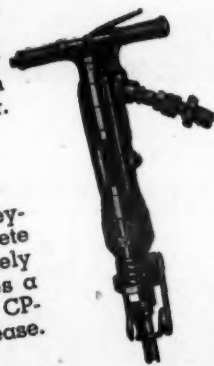
#### CP-32 SINKER DRILL

Fast drilling speed, strong rotation and good hole cleaning makes the CP-32 ideal for shaft sinking, quarry drilling, general excavation and road work.

**CP NO. 5 DIAMOND CORE DRILL**  
A light, one-man drill that weighs only 160 pounds without rod puller. Combines power, air economy, ease of handling, high drilling speeds, maximum core recovery and low cost per foot drilled. Drills to 500 feet depth with EX fittings. CP No. 5 works on any standard saddle, in any position from a column, arm or crossbar.

#### CP-117 DEMOLITION TOOL

Indispensable as a time and money-saver in tearing out dense concrete and similar medium-to-extremely hard materials. CP-117 strikes a heavier, slower blow than the CP-116, but handles with the same ease.



#### CP-60 MOTORDRIFTER

Recommended for drilling in hard, seamy or ravelly formations, or tunneling from jumbo drill carriages. The CP-60's outstanding feature, the MOTORfeed, speeds up the drilling cycle, lessens operator fatigue and reduces accident risks, overall time and costs.



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PNEUMATIC TOOLS  
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TOOL COMPANY

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\*\*\*\*\*  
AIR COMPRESSORS  
VACUUM PUMPS  
DIESEL ENGINES  
AVIATION ACCESSORIES





Official U. S. Navy Photo

After the Battle of Kwajalein in the Marshall Islands, Caterpillar diesel tractors with scrapers and bulldozers operated by Navy Seabees began the task of converting this island into a useful and indispensable advance base for our armed forces.

## AED Holds Annual Meeting in Chicago

The Twenty-Sixth Annual Meeting of the Associated Equipment Distributors is being held at the Edgewater Beach Hotel in Chicago January 22-25. Prominent on the program are a discussion of the disposal of surplus government-owned construction equipment and of post-war reclamation and other construction.

The first day of the meeting, Monday, January 22, will be given over to general business, including the nomination and election of officers and directors for 1945, reports of committee accomplishments, an address by Jay Maish, advertising executive, on "Distributor Advertising" and other addresses by A. F. Garlinghouse of Los Angeles, Saul Gottesmann of New York, and A. E. Hahn of Atlanta, Ga., AED Vice President.

Because of the vital importance of the disposal of surplus government-owned equipment, practically all of Tuesday, January 23, will be devoted to this subject. E. P. Phillips, Director, Construction Machinery and Farm Equipment Section, Treasury Surplus Property Division, will be one of the principal speakers. Thomas S. Holden, President, F. W. Dodge Corp., will also deliver an address, and a number of distributors and manufacturers will take part in the discussion.

On Wednesday, the speakers will include G. M. McGee, Research Engineer, Association of American Railroads, who will talk on "Future Possibilities of Construction Equipment in Railroad Maintenance"; Major General Eugene Reybold, Chief of Engineers, and William E. Warne, Assistant Commissioner, Bureau of Reclamation, both of whom will talk on post-war flood control and reclamation projects; Lowell Swenson, Manager, National Aeronautics Association, whose topic will be "The National Airport Program and Markets for the Sale and Rental of Construction Equipment"; George Dimond, Insley Mfg. Co., Indianapolis; and E. P. Palmer, Chairman, Construction Committee, U. S. Chamber of Commerce.

The annual banquet will be held Tuesday, January 23. The meeting of the 1944 Boards of Directors will be held on Sunday, January 21, while the 1945 Board will meet on Thursday, January 25. It is anticipated that this meeting of the Associated Equipment Distributors will be one of the largest and most important ever held.

### LeTourneau Staff News

Eugene E. Weyeneth and Joseph G. Van de Loo have been named Manager and Assistant Manager, respectively, of the Advertising Department of R. G. LeTourneau, Inc., Peoria, Ill., manufacturer of heavy earth-moving equipment. Both have a background of nearly ten years in advertising, and they wrote much of the copy for which their or-

ganization received an award from the Associated Business Papers in 1943. Robert G. Prince has been appointed Manager of the Training Department.

These three men succeed George C. McNutt, formerly Advertising Manager, who resigned on November 15 to return to California, and A. R. Thomson, who is now associated with Lyle Hosler, Advertising, in Peoria.

### New Dip Tank Catalogs

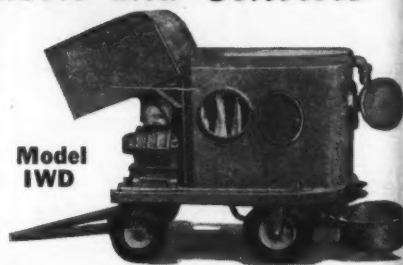
Aeroil insulated hot dip tanks, for metal and parts cleaning, degreasing, rust-proofing, paint stripping, and similar service, are illustrated and complete specifications given in two new 16-page catalogs just issued. These tanks are fueled by city gas, natural gas, or may be electrically heated with thermostatic control.

Copies of the descriptive catalogs may be secured upon application to the Aeroil Burner Co., 5775 Park Ave., West New York, N. J. Just mention CONTRACTORS AND ENGINEERS MONTHLY.

### What YOU SHOULD KNOW ABOUT

- 1 Portable units operate through powerful air stream by an effective double separation principle. No dust escapes into the air. Reduces SILICOSIS hazard to safe hygienic limit.
- 2 When applied to rock drills, SPEEDS UP DRILLING TO 33 PERCENT. Drill steel cuts into fresh rock unimpeded by dust or chips. PROLONGS LIFE OF DRILL STEEL. REDUCES SHARPENING COSTS.
- 3 Quick detachable hood permits easy inspection of hole and changing drill steel without interference from hood.
- 4 When applied as industrial unit, collects dust accumulations that are costly and apt to be a hazard both to men and equipment. Keeps your plant, motors and machinery free from harmful dusts.
- 5 Equipped with Markley-Carter disposal container which permits continuous collection and disposal without closing down the system.

## MARKLEY-CARTER Portable DUST COLLECTORS "Collects and Controls"



Model IWD

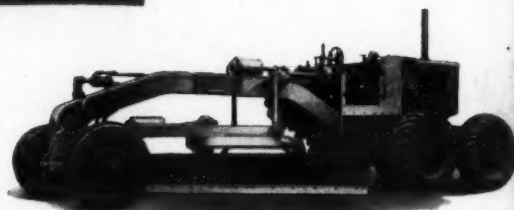
Write for Bulletin 4402 which describes in detail the advantages of using MARKLEY-CARTER DUST COLLECTOR in your quarry and plant.

**RALPH B. CARTER COMPANY**

192 ATLANTIC ST., HACKENSACK, N. J. 53 PARK PL., N. Y. 7, N. Y.

# GALION "TOPS" PERFORMANCE

Both men and machines are giving of their best in this war... both men and machines command our respect for their efforts to bring peace to the world. Time and time again you will find that Galion rollers and motor graders played a vital part in the advance on many of the fighting fronts... building strategic roads and airports. Galion road machinery will prove equally as important tools in any postwar construction program.

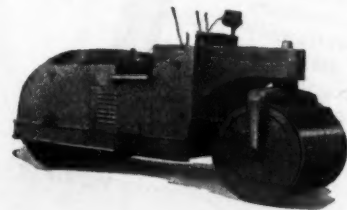


Galion No. 101 motor grader for that heavy grading job.

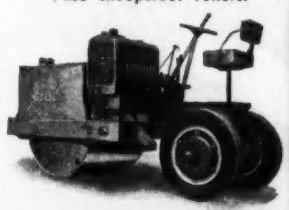


U. S. Signal Corps Photo

Galion Tandem roller (below). A Galion 3-wheel Chief roller is shown above.



A Galion portable roller is shown below. Also sheepfoot rollers.



### A COMPLETE LINE

of road rollers—gasoline or diesel power—for precise compaction in road and airport construction. Be sure you say GALION on that next job.

SEND FOR LITERATURE.

**THE GALION IRON WORKS AND MFG. CO.**  
Main Office and Works: Galion, Ohio

# GALION



# New Giant Rollers For Better Bases

Reconstruction of Runways Built Two Years Ago Made Necessary by New, Heavier Planes and Weak Subgrades

IT is no violation of the rules of military secrecy to state that the size and weight of military aircraft have grown by leaps and bounds, and one would be foolish indeed who would predict where this growth will stop. At the present time, we have many airfields which were constructed two or three years ago for what were then "heavy bombardment planes" which are now inadequate for the even larger planes at present in service. Some of the new airports were constructed for airplanes that were, at that time, merely in existence in the designer's mind or on the drafting table, but many fields are now being reconstructed to support the very heavy wheel loads of these new super planes.

Where soil in its natural state is uncompacted, a greater total thickness of pavement, base course, and imported fill material is required to support safely a given heavy wheel load than where the same natural soil is compacted to a high density. That being the case, it is apparent that an increase in density of the subgrade will permit a reduction in thickness of pavement or base course, with an attendant reduction in cost. To be really effective, the increase in density of the subgrade must be carried to considerable depth. The compacted subgrade, in effect, becomes a replacement for a portion of the normally imported fill.

To illustrate the advantage of compacting subgrade material to a considerable depth, the Sacramento District, Corps of Engineers, U. S. Army, cites the following example. It is desired to construct a runway for the heaviest planes now in service at a field where the natural soil forming the subgrade is a plastic clay or adobe having a California bearing ratio (CBR) of 3 per cent. The required total thickness of pavement and base course on this material in its natural state is 46 inches. This total pavement structure would consist of 4 inches of asphaltic concrete on 6 inches of crushed rock or well graded gravel base course having a minimum California bearing ratio of 80 per cent. The remaining 36 inches would be an imported fill having a CBR of not less than 35 per cent.

If the subgrade, that is the natural soil, can be so compacted that its CBR is increased from 3 to 8 per cent to a depth of 21 inches, the total thickness of pavement, base, and imported fill required for the same wheel load would be 25 inches, a saving of 21 inches of im-



U. S. Engineers Photo

It's job nearly completed, this giant sheepfoot roller, designed by the Sacramento District, U. S. Engineers, climbs out of a compacted subgrade.

ported fill.

With the roller equipment customarily used on road and airport work, a 6-inch layer of material is about the maximum that can be satisfactorily compacted to U. S. Engineer specifications at one time. With this equipment,

the compaction of 21 inches of subgrade could only be accomplished in four lifts and would require excavation of three-fourths of the material which would be stockpiled, thus permitting the compaction of the lowest one-fourth thickness in place. The stockpiled ma-

terial would then be replaced in layers and compaction-rolled, one layer at a time. This procedure may or may not result in a saving in cost, depending on the distance the 35 per cent CBR imported fill must be hauled.

A second method of achieving the same objective, developed by the Sacramento District, Corps of Engineers, U. S. Army, is to compact the entire 21-inch layer of subgrade material in place in one operation. To do this requires a sheepfoot roller with feet not less than 18 inches in length measured from the drum of the roller. For feet of that length to penetrate and tamp the earth, the unit load on each foot must be high. To this end, the Sacramento District has constructed a giant sheepfoot roller.

## The Giant Sheepfoot

The roller, as originally built, had a steel drum 8 feet in diameter and 10 feet long, to the surface of which 48 steel feet were welded. These feet were 18 inches long with diamond-shaped pads  $2\frac{1}{2}$  x

(Concluded on page 53)

**PROVED  
BY COST-RECORDS  
ON HUNDREDS OF JOBS**



**ECONOMY STEEL FORMS**

A major steel formwork and engineering service that saves money and time in concrete construction. For more information, write to the National Steel Formwork Corp., 100 West 42nd Street, New York 18, N.Y.

**WON'T QUIT  
or cause time out**



A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

The Hayward Company

32-36 Dey Street  
New York, N.Y.

**Hayward Buckets**



## Dirt-Moving Outfit Tackles Strip Mining

(Continued from page 11)

sprinkle the roads and also supply the rigs with water.

At one point at one of the sites a 40-foot-deep ravine is spanned by a bridge 105 feet long to provide access to the stripping operations. The bridge substructure consists of wooden bents set on concrete piers and abutments. The two abutments are 25 feet long, 2½ feet wide, and 6 feet deep. Each bent, of which there are six spaced 15 feet apart on centers, has four concrete footings 3 feet square and of varying depth. Dowels of 1-inch round steel bars 2 feet long are set in each pier to anchor the bents. The latter are composed of four 12 x 12's, 40 feet long capped by 12 x 14-inch sections. These were lifted into place by a Bay City truck crane. Holes were bored in the bottom ends of the 12 x 12's which were fitted over the dowels in the piers. Overlapping 12 x 14-inch stringers, at least seven across, were next placed, on top of which was laid a floor of 3-inch planks making a roadway width of 10 feet. A wooden guard rail of 2 x 4's completed the bridge.

### Removing the Overburden

The path that the coal veins follow, based on borings, is laid out by survey parties. Then the big excavating rigs go into action. One job is using two Page 621 diesel walking draglines with 110-foot booms and 6½-yard buckets which move a scoop of earth every 40 seconds. A Lima 1201 3-yard dragline is also used on the overburden together with a Bucyrus-Monighan 5W with a 100-foot boom and 5½-yard bucket. These diesel excavators, though of tremendous size, are so skillfully handled that they remove up to 60 feet in depth of overburden, and yet do not scrape up or dislodge any of the coal when the vein is reached. The overburden is not hauled away but is cast on both sides of the cut until the coal is removed, whereupon the cut is backfilled. The width of the cuts depends on the width of the coal veins and varies from 50 to 150 feet. At another site a Page 625 and a Bucyrus-Monighan 6W diesel dragline with 6½-yard buckets are removing the overburden. A LeTourneau roter is used to loosen compact overburden ahead of excavating. Engineers estimate that from 10 to 12 yards of overburden is moved to get out 1 ton of coal.

### Mining the Coal

When the coal has been reached, the top of the vein is carefully swept free of any earth, shale, rock or foreign material by two rotary brooms. The top layer of roof coal is discarded while the remaining coal, which may consist of a vein 4 feet thick, is next removed and hauled to the coal tipples. The coal is loosened by light dynamite blasts when necessary. Holes are drilled by two Ingersoll-Rand drills, one vertical and one inclined; two 4-inch portable Hardsoeg drills, one vertical and one horizontal; and one 6-inch horizontal drill.

At one site a Bucyrus-Erie 54 2½-yard gas shovel and a Northwest 80 2-yard gas shovel dig the coal, while at another the digging is done by a Northwest 2-yard shovel. Twelve bottom-dump Euclids are used on both jobs for coal hauling. These units are rated at 20-ton capacity but carry about 15 to 16 tons of coal. At the initial site an 8-yard Wooldrige scraper pulled by a Caterpillar D8 tractor is used for final clean-up of a coal vein, while at another location this is done by a 12-yard LeTourneau Carry-all pulled by a Caterpillar D8 tractor.

Any low spots which may develop in the digging are kept free of water by three Jaeger 4-inch pumps and four 2-inch pumps of other makes. Also in use

on one job are two D8 and two D4 tractors with bulldozers for road building and general earth moving, while at another an Allis Chalmers and a Caterpillar D8 with bulldozers are in operation. An Autocar winch truck is also in service. Four portable Lincoln electric welding sets cover both operations for equipment maintenance.

### Maintenance of Equipment

The center of equipment maintenance is at the first mine where a 47 x 80-foot machine shop is located. This building and all the others at the job site are of wood construction with concrete floors. Heavy lifting is done by a 5-ton hoist on an overhead rail. Equipment parts are cleaned before repair by a Hypressure Jenny JM steam cleaner. Three lathes are in use: a 36-inch x 14-foot and a 24-inch x 12-foot Lodge & Shipley, and a 4-inch x 10-foot lathe. Equipment also includes a Gould & Eberhardt shaper, a 1-inch drill press, a Racine power hack saw, a 1½-inch bolt threading machine, a grinder for drills, and an Autostart

grinder.

Batteries are charged by a G-E Tungar battery charger. Valves are faced on a Black & Decker Super-Service valve refacer. A Barrett brake-relining machine handles the brakes on equipment. A 150-ton Lourie press completes the equipment in the machine shop, which is protected by fire extinguishers. Fourteen men are employed here.

Directly behind the machine shop is a 20 x 40-foot welding shop where 2 G-E WD-34 440-volt arc welders are housed. To the rear is a 26 x 32-foot blacksmith shop containing a forge, anvil, and an old Niles-Bement steam hammer recently converted for operation by compressed air. A Sullivan WN 102 compressor driven by a Caterpillar diesel engine supplies compressed air at 125-pounds pressure. Other buildings include a 10 x 13-foot storage shed for acetylene tanks, a 40 x 40-foot warehouse, and the main office which has 1,790 square feet of floor space. There is also a small one-room office 12 x 20 feet for the engineers.

At two of the mines there are grease

houses, 20 x 72 feet, with pits large enough to service a Euclid. Greasing and lubricating of all equipment except tractors are done on the inside, but the latter are serviced in the open. One of the grease houses has an oil-reclaiming unit. A U. S. compressor supplies compressed air at each house for driving the grease guns. Outside of the grease house are three pumps, two for gasoline and one for diesel oil, with the storage tanks buried underground. Two 1,200-gallon tank trucks containing both gasoline and fuel oil service the equipment at the mines. Gasoline and oil are furnished by the Gulf Oil Co.

One of the locations also has a repair shop 48 x 24 feet containing a Lincoln electric welder, an 8-inch Black & Decker ball-bearing bench grinder, and miscellaneous small tools. There are also three overhead cranes of 1½-ton capacity running on girders.

### Personnel

To care for its personnel, the contractor (Concluded on next page)

## READ THE FACTS!

SADVE M. MCKENZIE  
SECRETARY-TREASURER

F. A. MCKENZIE, JR.  
VICE-PRESIDENT

**ATLANTIC DREDGING & CONSTRUCTION COMPANY**  
OKEECHOBEE, FLORIDA

ADDRESS REPLY TO  
FIELD OFFICE AT:  
Box 957  
Pine Bluff, Arkansas

November 7, 1944

Little Rock Road Machinery Company,  
813 East Second Street  
Little Rock, Arkansas

Gentlemen: --

We are pleased to answer your inquiry relative to our experience with the three MISSISSIPPI WAGONS we purchased from you for use on our 1,096,000 yard levee construction job near Pine Bluff, Arkansas.

We are moving at least 2500 yards of paydirt every 10-hour shift with these units on hauls up to 800 feet one-way, or 1600 feet round-trip. This is a larger volume than we ever secured with three hauling units before under similar conditions. Our haul road is spongy, but due to the flotation of the MISSISSIPPI WAGON, we can carry a full pay load. We also make good speed in spite of the rough haul road, due to the comfort provided the operator, and the ease and safety of the steering, since drivers do not have to worry about having the steering wheel knocked from their hands on rough haul roads.

For the yardage moved, the fuel consumption on the MISSISSIPPI WAGON is less than half of the fuel consumed by any hauling unit we have ever previously used.

We had some hauling to do over extremely sandy haul roads that all of our previous experience definitely indicated could not be accomplished by any rubber tired hauling equipment, but we tried the MISSISSIPPI WAGONS on this haul and found they handled it with ease. We attribute this primarily to the low pressure drive tires used on the tractor, which have an unusually large ground contact area when the weight transfer mechanism was used.

The MISSISSIPPI WAGON has given us the cheapest hauling costs we ever had on construction work, and we feel they will do likewise on long gravel or topping hauls, which eliminates the need for two investments.

The above, plus the fact that they dump sticky buckshot cleaner and quicker than any hauling unit we ever used, and the extremely low cost of replacement parts, satisfies us very much with our investment in MISSISSIPPI WAGONS.

We have had over 30 years experience in the contracting business on various types of construction work throughout the southeastern part of the United States, with contracts for as much as 7,000,000 yards at one time, and we are better pleased with our investment in MISSISSIPPI WAGONS than any hauling units we ever invested in before.

Yours very truly,  
ATLANTIC DREDGING & CONSTRUCTION COMPANY  
By *F. A. McKenzie Jr.*  
Vice-President

FAMT:jm

THE ABOVE LETTER GIVES MANY REASONS WHY IT PAYS TO USE

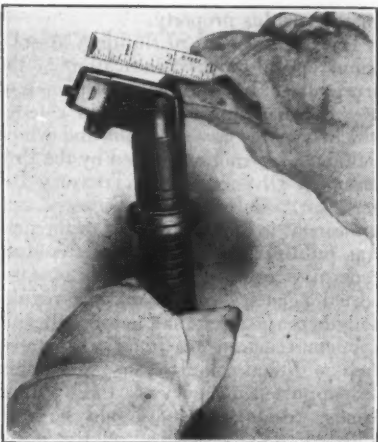
## MISSISSIPPI WAGONS



tor has set up an attractive trailer camp within a mile from one of the mines. Twelve families are now living there and are supplied with electric lights, running water, shower baths, toilet facilities, and stationary tubs for laundering. These facilities are housed in wooden frame structures and the trailer court was occupied all last winter.

### An Electrode Holder That Speeds Welding

A new electrode holder, designed to allow unobstructed visibility while welding, maximum accessibility even for deep pocket work, fast loading and re-loading, plus the wartime-stressed need for completely using up electrodes, has been announced by the Hollup Corp., Division of the National Cylinder Gas Co., 205 W. Wacker Drive, Chicago 6, Ill. This new Shortstub electrode holder makes it possible to use the electrode right up to the uncoated end of the rod, as only 1/2 inch is needed for a tight cur-



The new Shortstub electrode holder to speed up welding operations in hard-to-reach locations.

rent contact in the holder jaw. An extension of the holder itself allows the stub end of the rod to be projected into the proper position for welding.

This holder is completely insulated and is set to load and unload in a matter of seconds. Because of its balance and light weight, it minimizes operator fatigue. Complete information regarding the Hollup Shortstub holder may be secured direct from the manufacturer by mentioning this illustrated news item.

### Haines Cut-Off Road In Alaska Abandoned

The cost of coping with slides and snow conditions has caused the abandonment of the Haines cut-off road in Alaska as an artery of traffic, according to reports from the headquarters of the Northwest Service Command in Edmonton, Canada. Constructed by contract for the Army Engineers at a cost of about \$10,000,000, the cut-off was intended to relieve traffic congestion on the White Pass and Yukon Railway between Haines, Alaska, and White Horse, Yukon Territory. However, the cost of keeping the road open has made its continued use impracticable, officials report.

## Post-War Highways For Massachusetts

**Bay State Needs Huge Total Of \$370,000,000 to Bring Highways up to Standards; Plans for Work Progressing**

By **RAYMOND W. COBURN**, Chief Engineer, Massachusetts Department of Public Works

♦ INITIAL post-war construction in Massachusetts will consist of a great deal of reconstruction work, some of which can properly be called deferred maintenance. Since it is not known how much money will be available for construction, it is difficult to state the dollar-volume, mileage, and types of construction which will be undertaken in our post-war program.

When the American Association of State Highway Officials was making its survey of the mileage and dollar-volume of construction which would be necessary to bring highways in all states up to the standard desired, we furnished an estimate of \$371,000,000. The percentage of this work that can be done in the first three post-war years will depend greatly upon the amount of money available and when the first three post-war years start. The longer the war drags on, the more work we shall have ready in the blueprint stage.

Massachusetts has lost from 30 to 40 per cent of her engineering personnel, either by the men going into the armed services, taking civilian positions with the U. S. Army or Navy, or going into war work. We have been unable to get any engineering students and as yet we have not employed any women in the drafting room. In some cases older men who would normally retire have been retained in the Department, and many of the men who would normally be on construction are now engaged in survey and design work.

There is now ready in the blueprint stage \$13,100,000 of work which covers approximately 70 miles of highway. Many of these forty-eight projects are of divided highway construction and, we hope, with limited access. With our present engineering force, we believe that we can add \$6,000,000 of work to this volume every six months.

Only sufficient funds are available to maintain the present force of engineers, but we believe that as our engineers return to the Department from military service and war work, we shall be able to secure the necessary funds to keep them busy. No state funds are immediately available for the purchase of right-of-way or for construction, unless money is transferred from the Governor's special emergency fund. However, we have already available for construction about \$1,500,000 of work where right-of-way is available.

A special Legislative Post-War Construction Commission has been set up in Massachusetts, which is making studies of highway problems throughout the state. This Commission is working closely with the Public Works Department and will finally certify or approve most of the work planned by the Department. Work to the amount of \$50,000,000 is now programmed, not including the special project in the City of Boston where studies are being made by an Engineering Committee to determine what should be done to solve the Boston traffic problem.

The AAA, at its recent convention in Chicago, called for a continuation of the Federal-Aid principle in highway construction and strongly recommended state constitutional amendments to prevent gas-tax diversion.

## HER USER TELLS WHY HE LIKES MISSISSIPPI WAGONS



MISSISSIPPI WAGONS on an Atlantic Dredging & Construction job near Pine Bluff, Ark.

## MORE AND MORE CONTRACTORS ARE FINDING MISSISSIPPI WAGONS THE ANSWER TO PROBLEMS IN COMPETITIVE HAULING

Whenever construction equipment—like the MISSISSIPPI WAGON—consistently does a job faster, better and cheaper, it gains more and more friends among contractors. The growing popularity of the MISSISSIPPI WAGON among veteran contractors is further evidence that the MISSISSIPPI WAGON is the "world's most modern hauling unit," designed for long and short hauls of dirt, gravel, topping, stone, coal, etc., over varied types of terrain.

Plan now to include MISSISSIPPI WAGONS in your 1945 operations. Be ready to enter a low bid in competing for hauling work. To fill varied hauling needs, the MISSISSIPPI WAGON is manufactured in three sizes as follows:

Model 75—10.5 yards heaped capacity (with standard sideboards)

Model 85—10.5 yards heaped capacity  
Model 120—15 yards heaped capacity.

The weight transferring feature, found ONLY in the MISSISSIPPI WAGON, prevents the vicious "beating" a tractor must take with the ordinary semi-trailer hauling unit. This feature adds life to the tractor, provides the extra weight needed for traction during bad going, and holds repairs to an unbelievable low cost.

There are many other features you'll like about this unit. Contact your nearest International Industrial Power distributor, or write us, for full information.

Remember, Postwar Competition Will Be Tough, but not for the owner of the MISSISSIPPI WAGON —

**"THE WORLD'S MOST MODERN HAULING UNIT."**

# MRS



**MANUFACTURING CO.**  
JACKSON, MISSISSIPPI





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## Outline for Disposal Of Surplus Property

The Surplus Property Act, for the disposal of materials, machines, and equipment purchased by the Federal government for use in the war, and one of the most controversial pieces of legislation passed by the Congress in its present session, became law on October 3, 1944. The Act scraps all previous proposals and establishes a three-man Surplus Property Board to be appointed by the President. This Board will have general supervision and direction over the disposition of surplus property, and is authorized to prescribe regulations and establish overall policies. Because of the general language of the law and broad powers given to the Board, the effect of its administrative procedures and their economic impact will be known only as the Board begins its actual operations.

The Act forbids the donation of surplus property and specifically states as one of its objectives "to obtain for the government as nearly as possible the fair value of surplus property upon its disposition". However, special provision is made to facilitate the transfer of surplus property between government agencies as well as the states and their political subdivisions. First preference is given to government agencies, but even here the law provides that the agency acquiring surplus property must pay a "fair value".

Next in line come the states and their political subdivisions and tax-supported institutions, which will have an opportunity to acquire surplus property before it is offered to the general public. But such preference is limited to "an opportunity to fulfill, in the public interest, their legitimate needs". This is seen as an effort to prohibit states and political subdivisions from building up abnormal inventories and to restrict their purchases to a level which would fulfill their legitimate needs. Exception, however, is made with regard to property that has no commercial value or whose care and handling would exceed the estimated proceeds. In such cases provision is made that any such property may be donated to Federal agencies or any state or local government. With this exception, it is the apparent intent of the law to guarantee a fair return to the government for all property disposed of.

As to the method of disposal, the law makes it possible to sell, exchange, lease, or transfer for cash or for credit upon such terms or conditions as may be deemed proper. It is obvious from this language that it is not intended to restrict sales to competitive bidding and it may be reasonably anticipated that a substantial portion of war surpluses will be disposed of on a negotiated basis. There is some question of this procedure since competitive bidding is more likely to insure a better return to the government, and consequently to the taxpayers,

for the surplus property.

The American Road Builders' Association reports the first indication of the procedure to be followed in disposing of used construction machinery in a letter which recently came to light and which contained instructions issued by the Procurement Division of the Treasury Department. Before used construction equipment is offered for sale to the general public, it will first be offered to Federal agencies and next to tax-supported agencies. The Treasury regulation then specifies that before offering any construction machinery to states, their political subdivisions, and other tax-supported agencies, the Public Roads Administration should be consulted as to the actual and relative needs of such agencies. To the extent practicable, negotiated sales would be based on the PRA recommendations. After used construction equipment has been offered to Federal and state agencies, it will then be offered to regularly established equipment dealers. If no purchasers are found for the equipment under

this procedure, the property will then be offered to the general public.

## Contractor Honored At Tanker Launching

Tribute was paid to Harry W. Morrison, President of Morrison-Knudsen Co., Inc., of Boise, Idaho, and a Director of Marinship Corp., at the launching of the tanker SS Montebello Hills at the Marinship yards recently. Sponsored by Mrs. Morrison, the 523-foot high-speed tanker was the sixty-first ship to be launched at Marinship in 25 months.

K. K. Bechtel, President of Marinship Corp. and master of ceremonies, spoke of Mr. Morrison's contribution in building the West. Morrison-Knudsen Co., one of the six companies associated in the ownership and operation of Marinship Corp., is one of the largest contracting firms in the West, having participated in the construction of Boulder, Bonneville and Grand Coulee Dams, as well as in scores of highways, bridges, tunnels, and fortifications.

## STANG-DRIED

STANGDRIED jobs scattered all over the Western Hemisphere forecast tomorrow's WORLDWIDE strategic locations of STANG Equipment and STANG Experts, ready to solve the worst problem of unwatering saturated soil, anywhere IN earth ON earth.

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**Chassis**—Tail steering wheel with spindle is Timken bearing mounted 16" diam. rim, front drive wheels 20" diam. Foot-operated hydraulic wheel brakes on two driver wheels; also emergency hand brake.

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The scoop is an integral part of the SCOOPMOBILE and is so constructed it can be raised, lowered, or dumped at any point in its operation. Scoop capacity is  $\frac{3}{4}$  cubic yard.

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# Detroit Expressway Reaches Completion

## New \$26,000,000 Highway Now Carries Traffic From City Line 34 Miles to Willow Run and Beyond

THE end of 1944 saw the completion of Michigan's Detroit Industrial Expressway. This new avenue of transportation is receiving the final touches at the eastern end of Section 3 where it meets the city limits of Detroit at Michigan Avenue and Wyoming Road. Now that construction is in the last stages of completion, the outward-bound motorist will soon be able to relax when he comes to the city line. From there on, driving will be a pleasure as he travels westward with not a single intersecting road, stop sign or traffic light to slow his progress for 31 miles until he reaches the western terminal of the Expressway at U. S. 23, about half way between Ann Arbor and Ypsilanti.

The Detroit Industrial Expressway was developed and designed by the engineers of the Michigan State Highway Department and built under their direction by mid-western contractors, for the most part, at a total cost of about \$26,000,000, including right-of-way. This new highway fills the need for a wide thoroughway westward from the congested Detroit metropolitan area to relieve heavily overburdened U. S. 112, a continuation of Michigan Avenue, which connects Detroit and Ypsilanti. A drive along this well traveled route has been tortuous and slow, especially since the war when industry seemed to line up along the very shoulders of the road, particularly where U. S. 112 passes through such heavy industrial sites as Dearborn. The Expressway by-passes these congested centers by cutting through the open country on a roughly parallel line 4 miles to the south.

For convenience in planning, developing and building, the Detroit Industrial Expressway was divided into three sections. Section 1, or the Willow Run Access Expressway System as it is usually called, was built first to relieve congestion of the existing trunk-line highways which connected the U. S. Bomber Plant at Willow Run with downtown Detroit 25 miles away. This plant has employed around 40,000 workers, most of whom live in Detroit and commute by automobile since there is no rail service. Consequently work on this section, which began in the autumn of 1941, was pursued vigorously. From the Bomber Plant, the road was pushed westward as well as eastward. To the west the highway consists of two 24-foot-wide pavements extending as far as U. S. 112 from which point it continues on as a single 24-foot-wide road as far as U. S. 23 1½ miles beyond.

Section 1 by itself would not help much in getting traffic flowing since it dead-ended in the open country at the intersection of Hannan Road about 9 miles east of Willow Run. So Section 2 was then hurried from the blueprint stage to construction and, with the build-

ing of this 11-mile stretch tying in with the Southfield Highway south of Dearborn, cars really began moving on the Expressway. These two sections were completed by the end of 1942 for an overall length of 25 miles.

Early in 1943 work was begun on the 6-mile Section 3 which, although the shortest of the three sections, was the most costly and the one presenting the most problems to the engineers and contractors. Until this section was opened, the Expressway could not really function in its major service of conveying workers from the Detroit metropolis to the Bomber Plant at Willow Run.

### The Right-of-Way

As a typical section of the finished roadway includes two 24-foot-wide pave-



The Detroit Expressway crosses Ecorse Road on two overpasses, the eastbound roadway in the background and the westbound on the structure in the foreground.

ments separated by a grassy area so wide that the center lines of the parallel roads are about 164 feet apart in open country,

it can be readily seen that a wide right-of-way had to be acquired. The standard (Continued on page 70)



## Combines Power and Speed With Positive Steering Control

Powered by a heavy duty diesel with four speeds forward and a reverse gear, Wooldridge Terra-Cobras attain travel speeds up to 21 M.P.H. on either short or long stretches. Surplus rim pull permits fast acceleration in a short distance and provides ample power to pull up comparatively steep slopes—fully loaded without a "pusher." Regardless of whether it is loading, traveling, spreading or turning, the Terra-Cobra maintains a fixed direction of travel due to positive two-wheel hydraulic steering control. Full traction and power is constantly applied and maintained on BOTH drive wheels, at all times . . . even on sharp turns. As no fatiguing effort is required to handle the Terra-Cobra, full production and higher average yardages can be expected from each operator on every shift. To combine speed with safety on your earthmoving operations rely on Wooldridge Terra-Cobras. Investigate fully, today.

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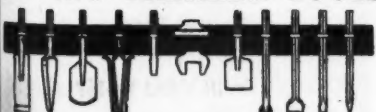
It is unnecessary to slacken speed when traveling, spreading or turning in order to maintain safe control of a Terra-Cobra, as there are no steering clutches to fight nor individual brakes to grab. Positive two wheel steering eliminates any possibility of "jackknifing."



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## Construction Outlook Is Uncertain for 1945

According to a recent report from the War Production Board, estimates of the amount of construction in 1944 indicate a volume of \$3,840,000,000, as compared with the \$3,900,000,000 programmed for that year in August, 1943, while the prospects for construction during 1945 very definitely hinge on the progress of the war in Europe. Should VE-Day come in the spring, it is estimated that 1945 construction of all types would amount to approximately \$4,000,000,000. However, should both theaters of war continue at full force throughout the year, it is anticipated that construction activity will be lower than in 1944, or about \$3,150,000,000, WPB stated.

Work financed by public funds accounted for only 61 per cent of the 1944 total activity as contrasted with nearly 80 per cent in 1942 and 1943. Activity volume for all major types of construction was less in 1944 than in 1943, with the sharpest decrease occurring in military

construction (troop housing, airfields and bases, storage facilities, etc.) which declined to \$730,000,000 from the \$2,423,000,000 volume of the preceding year. New housing activity in 1944 was slightly more than half the 1943 volume, while all non-industrial construction, such as highways, sewer and water facilities, community buildings, conservation, utilities, and similar work, amounted to \$1,505,000,000, or 84 per cent of the 1943 volume. Publicly financed work was down 33 per cent from the 1943 level, with the sharpest drop occurring in highways, conservation work, and public pipe-line construction.

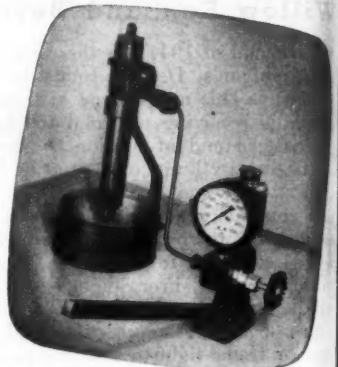
The WPB has prepared two sets of estimates of construction volume in 1945, one premised on the continuation of the war in Europe, and the other based on the defeat of Germany this spring but with full-scale operations against Japan continuing. According to these estimates, highway construction will amount to about \$325,000,000 if we continue to fight a full-scale war on two fronts, but might rise to \$450,000,000 if

Germany is knocked out of the war this spring. Conservation work is estimated to be either \$150,000,000 or \$185,000,000, under the same conditions, while sewer and water construction is estimated at either \$80,000,000 or \$100,000,000, depending on the war.

## Mack Names Michell Asst. Chief Engineer

William P. Michell has been appointed Assistant Chief Engineer of Mack Trucks, Inc., following his return from Great Britain, where he had been serving in an advisory capacity on military truck transport at the invitation of the British government. Mr. Michell joined the Mack organization in 1923 and became assistant to the Chief Engineer in 1937. He is Chairman of the Motor Truck and Motor Coach Division Standards Committee of the Society of Automotive Engineers, and is a member of the American Society for Testing Materials and the Army Ordnance Association.

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WAUKESHA, WISCONSIN





Spreading Stabinol by hand on a 1/4-mile experimental base-stabilization project near Farmville in Virginia.

## Chemical Stabilizes Heavy Clay Base

Virginia Experiments With Water-Repellent Chemical; Mechanically Mixed and Rolled; Asphalt Top

† A 20-foot clay soil road near Farmville in south central Virginia, about 65 miles southwest of Richmond, was recently stabilized for a 6-inch compacted depth with a chemical, Stabinol, which has the property of waterproofing most soils. This experimental stabilized base course, which was about 1/2 mile in length, will later be given a black-top surface. Stabinol is a light brown powder, a combination of a specially treated resin, cement, and other chemicals that mix easily with soils. No more than from 1 to 2 per cent of Stabinol is used in relation to the weight of the soil to be stabilized.

The predominant soil on the Farmville project was a heavy clay with a high mica content, classified A5-A7 by the Public Roads Administration standards. A short section of the soil had an A-2 classification. The analysis of the soil follows:

Hydrometer Analysis on Material Passing No. 10 Sieve	
	Per Cent
A2-A7	93-98
Passed No. 10 sieve	69-50
Total sand (2.0-0.05 mm)	25-14
Silt (0.05 to 0.005 mm)	6-36
Clay (0.005-0.001 mm)	21
Cellulose (Less than 0.001 mm)	
Soil Constants	
Liquid limit	32-75
Plastic limit	NP-36
Plasticity index	NP-39
Shrinkage limit	17-22
Volumetric change	36
Analyses made at Hercules Powder Co. Laboratory	
Optimum moisture (per cent)	17
Maximum density (lb./cu. ft.)	112
PI of soil	4.8
Type soil	A2-A7
Color	Red-Brown

The analysis showed that every square yard of soil would need 10 pounds of Stabinol. The powder was shipped in 75-pound asphalt-laminated paper bags and was then spotted along the road to be treated at intervals of 3 feet.

Since only a short section of road was selected for the experiment, the Stabinol was distributed on the road by hand instead of using a mechanical spreader such as is employed on larger jobs. The bags were cut open and dragged across the road with their open ends on the ground, until the entire roadbed had been covered with a uniform layer of the chemical powder.

### Soil Mixing

The road was first loosened by a scarifier pulled by a tractor. When it had been thoroughly broken up, preliminary mixing of the Stabinol in the soil was accomplished by two spring-tooth harrows and one 10-foot disk harrow, with 22-inch disks.

After preliminary mixing had been completed, a three-blade plow was used to turn the bottom of the bed over, and mixing was continued by a tractor-drawn

Seaman Pulvi-Mixer until approximately 90 per cent of the road material would pass through a No. 4 sieve. After this final mixing, the road was shaped with a motor patrol grader, followed by a spring-tooth harrow to loosen the soil

which had been compacted by the wheels of the grader.

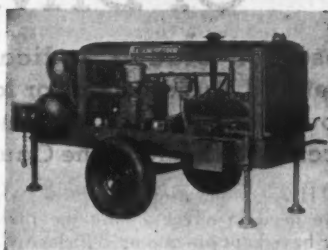
The base was then rolled by a sheep-foot roller until all but the top 1/2 inch of the base had been compacted. The sheepfoot roller was followed by a spike-tooth harrow to break up compaction planes.

The top 2 inches of soil became too dry for proper compaction, and water had to be added from a distributor truck to bring the moisture up to optimum. The sheepfoot roller and spike-tooth harrow served to work this water into the soil so that proper density was obtained.

After mixing the water into the soil, the road was again shaped by the motor grader and then rolled by a wobble-wheel roller. After the road had been rolled a few times, the motor grader was again used to remove about 1/2 inch of material from the surface by blading from the center of the road towards each edge. This surface material was wasted on either side of the roadway and the

(Concluded on page 80)

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ALL THREE are available to you to help you with your job of maintaining the nation's highways for heavy war time traffic

The guiding principles of PNEU-HYDRO are:

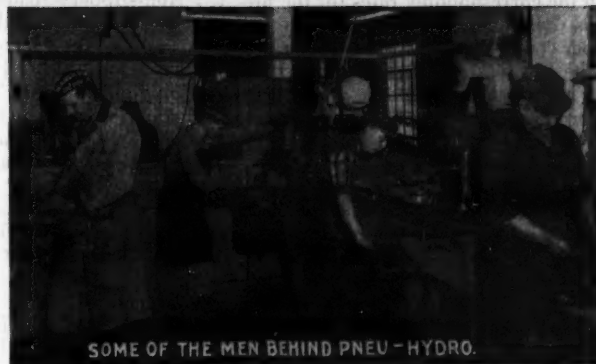
1. SIMPLICITY IN DESIGN
2. RUGGEDNESS IN CONSTRUCTION
3. ENGINEERING ALL PRODUCTS TO BE ADAPTABLE TO THE CURRENT EQUIPMENT AND NEEDS OF THE MEN WHO KEEP THE ROADS OPEN

PNEU-HYDRO UNDERBODY ROAD PLANNERS and SNOW PLOW CYLINDERS are engineered to fit your equipment and are built to give you long, trouble free, and economical service

### INQUIRIES

from

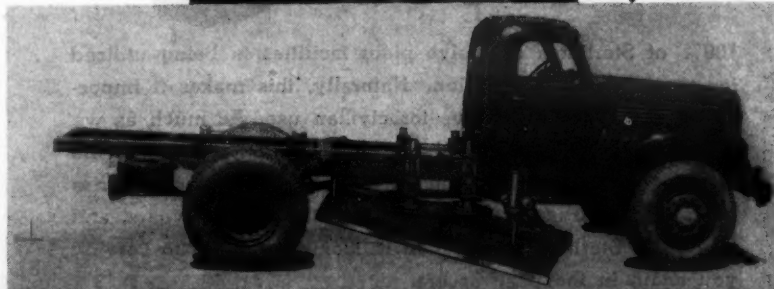
INTERESTED DISTRIBUTORS  
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SOME OF THE MEN BEHIND PNEU-HYDRO.



## PNEU-HYDRO PRODUCTS



**PNEU-HYDRO ROAD MACHINERY CO.**  
MANUFACTURING DIVISION OF  
**GENERAL SALES COMPANY**  
CADILLAC — MICHIGAN



# Reducing the Hazard Of Driving in Winter

## Research Studies Indicate Wet and Muddy, Snow or Ice-Covered Pavements Cause Accidents; Remove the Cause

THE conservation measures which have been in effect during the present war have kept our motor vehicles rolling beyond all reasonable expectations. But we are now faced with many critical shortages, and probably shall be for some time to come. The war is not yet over, and its ultimate and inevitable conclusion may be many months away. This should inspire us to hold more closely to the conservation measures which offer the best opportunities to keep our vehicles rolling right through the war period and into the post-war period. The elimination of needless winter accidents, with their attendant damage to persons and equipment, will help in reaching this conservation goal.

### Winter Increases Accidents

The traffic death rate for the winter of 1943-44 was 53 per cent higher than the 1943 summer rate for the northern half of the United States and 24 per cent higher for the southern states, according to statistics of the National Safety Council. This represents a marked increase in winter-accident rates when compared with the corresponding rates for the previous year for which the winter rate was 24 per cent higher than the summer rate of the northern states and only 5 per cent higher in the southern states. Any abnormal increase in traffic accidents during this winter will contribute heavily to the highway transport crisis facing the nation in 1945. Consequently, measures must be taken to eliminate the wrecking of irreplaceable cars, trucks and buses in needless winter-driving accidents. The importance of winter accidents during the war period is indicated by the fact that the greatest number of traffic accidents now occur during the winter months instead of the late summer and autumn months as was the case in the pre-war period.

There has been a reduction in the accident rate during the war. Two important factors which contributed to this are less travel and reduced speed. The

reduction in travel during the last year was greatest in the summer months and was an important factor in reducing the summer-accident rate.

The speed reduction during 1943-44 was fairly uniform during the year and, while it may have contributed to a reduction in the accident rate, the study of winter accidents by the Committee on Winter Driving Hazards of the National Safety Council, Professor Ralph A. Moyer, Chairman, indicates that, with last year's average speed of 35 to 40 mph, the reduction was not great enough during the winter months to reduce winter accidents, especially in the northern states on the slippery snow and ice-covered roads which require a much greater reduction in speed for safe driving.

Previous studies of the Committee on Winter Driving Hazards have revealed that the principal causes of high winter-accident rates are slippery, wet or mud-covered or snow-covered or ice-covered road surfaces and poor visibility due to long hours of darkness, fogged windshields, snow storms, etc. Accidents on slippery road surfaces are usually reported as skidding accidents, and the number of such accidents reported for each month provides an index of the influence of skidding accidents on the winter-accident rate.

Non-slippery road surfaces, commonly prevailing during the summer months, are an important factor in keeping down skidding accidents. Therefore, the most effective method of reducing skidding accidents during the winter months is to remove the snow and ice from pavements as promptly as possible and install good drainage so that the pavements can be clean and dry, thus providing the same safe driving surface for the winter months as for the summer.

Skidding accidents in Iowa, studied by Professor Ralph A. Moyer, who is Research Associate Professor of Highway Engineering at Iowa State College, show that they increased from 6.8 per cent of all accidents in 1938 to 13 per cent in 1943. Similar data on skidding accidents are not available from all states, but a conservative estimate of the National Safety Council shows a 5 per cent average for the United States in

1943, based on available data. If this figure is accepted as correct, the accidents due to skidding during the three-year war period will exceed 120,000 for the United States, including not less than 4,000 fatal accidents. The present critical shortage of tires, garage mechanics, transport equipment, and experienced drivers makes it imperative that measures be adopted by public officials, transport operators, and individual drivers to reduce winter traffic accidents by every means at their disposal.

A study of skidding accidents, as compared on a rural and urban basis with all the traffic accidents occurring in Iowa during 1943, shows that the number of skidding accidents is about twice as great for urban as for rural traffic, although the rural traffic in Iowa is more than double the volume of urban traffic. There were, however, only two fatal accidents in urban traffic, compared with twenty-two in rural traffic. This low fatality rate can be largely attributed to the slower speeds of city traffic. This emphasizes the value and need for re-

ducing vehicle speeds on icy and snowy pavements in rural areas where deaths due to skidding accidents are most frequent.

### A Winter Program

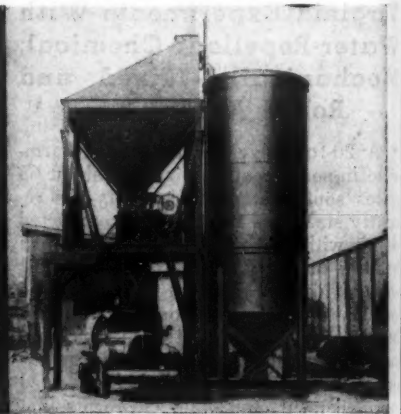
For the past five years the Committee on Winter Driving Hazards of the National Safety Council has made an exhaustive study of the causes and methods of preventing winter traffic accidents. During this period, thousands of tests were run on frozen lakes and on sleet-covered and snow-covered highways in a comprehensive research program to investigate vehicle performance characteristics on these surfaces as they relate to skidding, braking, accelerating, and to determine the measures which should be adopted to eliminate the special hazards which these surfaces create.

The Committee has recommended the following program of action to reduce accidents during the winter months:

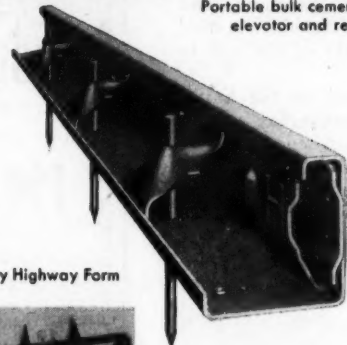
1. An adequate highway and street winter maintenance program to keep all

(Concluded on page 94)

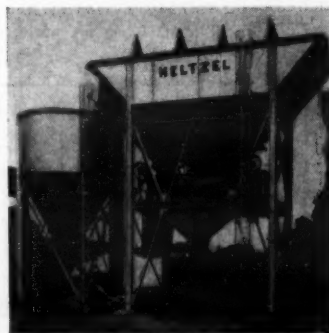
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BUILDS IT BETTER  
MODERN • DEPENDABLE  
Forming and Handling Equipment  
for all Concrete Projects  
CONSULT HELTZEL FIRST  
Send for Complete Information Today



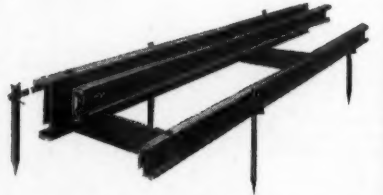
Portable bulk cement plant with built-in elevator and re-circulating tank



The new Heltzel Military Highway Form



A typical Heltzel Truck Mixer Charger—600 ton Batching Bin—1200 bbl. Bulk Cement Reserve



Steel Curb and Gutter Forms for any cross section on specification



Portable aggregate Batching Bins made by Heltzel in capacities ranging from 30 to 200 tons.

BINS, Portable and Stationary  
CEMENT BINS, Portable and Stationary  
CENTRAL MIXING PLANTS  
BATCHERS (for batch trucks or truck mixers with automatic dial or beam scale)  
BITUMINOUS PAVING FORMS  
ROAD FORMS (with lip curb and integral curb attachments)  
CURB FORMS  
CURB AND GUTTER FORMS  
SIDEWALK FORMS  
SEWER AND TUNNEL FORMS  
CONCRETE BUCKETS  
SUBGRADE TESTERS  
SUBGRADE PLAINERS  
JOLI BOXES  
FINISHING TOOLS FOR CONCRETE ROADS



100% of Sterling's extensive plant facilities is being utilized for essential war production. Naturally, this makes it impossible to ship wheelbarrows for civilian use. As much as we would like to take care of our good customer friends, the needs of the present conflict must take precedence. It has been a real pleasure to serve you in the past 40 years, and the entire Sterling organization is looking forward to serving you again in the postwar era.

STERLING WHEELBARROW CO., MILWAUKEE, WIS.



Look for this Mark of STERLING Quality

**Sterling**  
WHEELBARROWS

**HELTZEL** STEEL FORM & IRON CO.  
WARREN, OHIO • U. S. A.



### A Hydraulic Jack With Two Lift Speeds

Buda two-speed hydraulic car jacks made in two models, 25-B-28 and 25-B-22, of 25-ton capacity, with rises of 22 and 16 inches, respectively, are described in detail in an illustrated bulletin, No. 1171, recently issued by The Buda Co., Harvey, Ill. The jack may be quickly adjusted for either fast or slow

lifting speeds, depending on the size of the load.

While primarily developed for use on heavy freight cars, these jacks find many comparable uses when field repairs are necessary on construction equipment. Copies of this folder will be sent promptly to readers of CONTRACTORS AND ENGINEERS MONTHLY who write direct to the manufacturer and mention this review.

### An Illustrated Book On Clamps, Tie Rods

A new, profusely illustrated and well-indexed book "Form Engineering", with a concluding tabulation of the types of forms used on different projects and the form hardware required, has just been issued by Williams Form Engineering Corp., P. O. Box 925, Madison Square Station, Grand Rapids 7, Mich. Included

in this book are standard form procedures as well as unusual procedures for tying circular forms, such as for tanks, silos, chimneys, sewer construction, and circular bridge piers.

Copies of this Catalog No. 1500 will be furnished promptly to readers of CONTRACTORS AND ENGINEERS MONTHLY in the concrete field who write direct to the manufacturers and mention this news item.



**Heil Hi-Speed  
CABLE SCRAPERS**

*... give you faster digging ... faster hauling ... faster dumping*

You can move more yardage faster and at less cost by taking advantage of the three main features of famous Heil Hi-Speed Cable Scrapers:

- ① You dig faster because this push-loaded unit gives you a heaped 15-yard load in 40 to 50 seconds.
- ② You can speed away to the fill at travel speeds of 6 to 20 M.P.H. depending on road and grade conditions.
- ③ At the fill, this unit spreads the load with a positive mechanical push-out action attained by tilting the floor. This fast, positive discharge is accomplished by a leverage action which exerts a low line pull on the unloading cable. The cutting blade remains in a fixed position in relation to the sides of the bowl and does not tilt with the dumping floor. Thus the load can be dumped at any desired height, and at travel speeds permitted by the grade.

Ask your Heil distributor for the complete story of why Heil Hi-Speed Cable Scoops give you fast, profitable dirtmoving at low cost per yard.

Write for special bulletins.

R-41

**THE HEIL CO.**

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN



# Heavy Gravel Base For Minnesota Road

## Frost-Boil Areas Treated, Additional Base Placed On Critical Sections Prior To Plant-Mix Tar Surface

MINNESOTA has a logical policy of placing permanent bituminous surfacing on roads only after critical soil areas, having been previously corrected from soil surveys, have been further proved under traffic and several winter seasons of use with an interim mat or temporary surface. Under this policy, a contract was awarded by the Minnesota Department of Highways to Ulland Brothers, Austin, Minn., on June 4, 1944, for 17.3 miles of bituminous surfacing, with necessary subgrade correction and additional gravel base, on Trunk Highway 33 near Cloquet, Minn.

### Frost-Boil Treatment

Frost-boil damage is extensive in this northerly section of Minnesota, and on various sections, aggregating about 3 of the 17.3 miles, the contract provided for excavation of unsuitable material from the subgrade to depths, in some cases, as great as 6 feet, and refilling with pit-run gravel from a state-owned pit located near the center of the job. A Unit  $\frac{3}{4}$ -cubic-yard power shovel was used to remove the unsuitable material, the existing gravel base first being bladed into windrows on each side to be replaced later on top of the frost-boil backfill. The porous backfill was so placed as to drain into outlet ditches; in one location this had to be accomplished by placing 540 linear feet of 6-inch perforated corrugated-metal pipe.

Material for frost-boil backfill was loaded by a Lima  $\frac{3}{4}$ -cubic-yard shovel to a fleet of twelve trucks of various makes, all hauling  $3\frac{1}{2}$ -cubic-yard loads. The average production was 800 cubic yards per 10-hour day. When delivered to the frost-boil area, the material was spread by a Bucyrus-Erie bulldozer on an International TD-14 tractor, with an Adams motor grader shaping the top foot as it was compacted by six to eight passes of a sheepfoot roller.

### Additional Gravel Base

On certain sections of the job, aggregating nearly 4 miles, where service had indicated the need for additional gravel base, the existing temporary surfacing, which consisted of a 75-pound mat of gravel with 5 per cent of SC-3, was scarified and bladed into equal windrows on each shoulder line by an Adams and a Caterpillar motor grader. It was there pulverized by rolling with a tamping roller, shaped, and rolled to form bituminous shoulders, with any excess over that required for the shoulders being returned to, and incorporated with, the upper zone of the new base gravel. Under Minnesota practice, that work was paid for by an hourly rental price bid for the use of grader and roller. The old SC mat proved to be exceptionally live and black and compacted readily to form stable shoulders.

Additional base was placed to a depth of 6 inches on 6,113 linear feet, to 9 inches on 4,000 feet, to 12 inches on 9,250 feet, to 24 inches on 700 feet, and to 30 inches on 500 feet. Specifications required that all the 6-inch thickness and the top 3 inches of all thicker courses be formed of gravel crushed to a maximum size of 1 inch, while for the lower portions of the thicker layers screened gravel with a 3-inch maximum size could be used. Both classes were spread in 3-inch layers full width between the bituminous shoulders and compacted by either tamping or pneumatic rollers as directed by the engineer, all rolling being paid for at the bid price per hour.

### Bituminous Surfacing

Aggregates for the bituminous wearing course were produced by the contractor, using two Pioneer No. 12 Duplex crushers in two pits located at about the quarter points of the 17-mile project. In these pits the gravel deposits could be worked with an approximate 14-foot face and very little stripping was required. The mineral aggregate met the following grading requirements:

Passing	Per Cent
$\frac{3}{4}$ -inch sieve	100
$\frac{1}{2}$ -inch sieve	95 to 100
$\frac{3}{8}$ -inch sieve	65 to 95
No. 10 sieve	35 to 65
No. 40 sieve	15 to 35
No. 200 sieve	4 to 8

The liquid limit of that portion of the aggregate passing a No. 40 sieve was required to be less than 25, according to Department of Highway specifications.

Before distribution of the mineral aggregate was started, a mixed prime was placed. Approximately 75 pounds of the gravel base material was windrowed and shot with 0.8 gallon of RT-5 tar per square yard. This windrow was then blade-mixed, spread, and rolled to form a working surface for the placing of the mineral aggregate and a foundation for the wearing course.

The mineral aggregate was distributed at the rate of 150 pounds per square yard, mixed with RT-5 or RT-6 tar by a Jaeger and a Barber-Greene traveling plant and spread 26 feet wide. It was then compacted by pneumatic-tire rollers.

### Major Quantities

The major bid items of this contract were as follows:

Excavation of unsuitable material	12,304	cu. yds.
Sand-gravel fill in place	15,998	cu. yds.
Clearing	1.2	acres
Grubbing	1.2	acres
Gravel-pit stripping	1,000	cu. yds.
Screening and loading	17,148	cu. yds.
Hauling	104,103	cu. yd. mi.
Crushing, screening and loading	11,668	cu. yds.
Labor hire	750	man-hours

Motor-grader rental	405	grader-hrs.
Compacting (pneumatic-tire roller)	355	roller-hrs.
Compacting (tamping roller)	170	roller-hrs.
Bituminous material for prime coat, RT-5 tar	48,023	gals.
Bituminous material for wearing course and tack coat, RT-5 or RT-6	356,531	gals.
Mineral aggregate for wearing course	19,808	tons
Wearing course	261,098	sq. yds.

### Personnel

The contract for this \$134,818.57 gravel-base and bituminous-resurfacing job near Cloquet, Minn., to be completed in 55 working days, was awarded by the Minnesota Department of Highways on June 9, 1944, to Ulland Brothers, Austin, Minn. Oscar Ulland acted as his own Superintendent. O. L. Kipp is Chief Engineer of the Minnesota Department of Highways and this job was handled by the Construction Department under C. L. Methven, State Construction Engineer. Arthur Tewes was Project Engineer in direct charge at the job site.

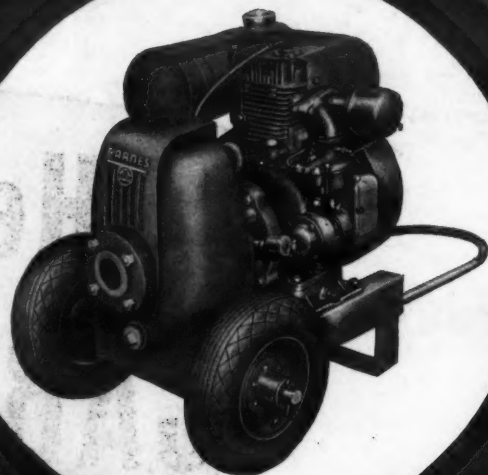
*With reconversion to civilian production indefinitely postponed, it is more important than ever to take care of your present equipment.*

## All Set to GO

... Barnes offers you the facilities of a completely modernized plant resulting from heavy wartime pump production (10 times greater than prewar levels), and an experience of working to the rigid precision standards of the Armed Forces.

... Twice recognized with the Army-Navy "E" Award for production "excellence", this same highly skilled organization stands ready to serve your requirements.

... AND, all set to GO is the newly designed and engineered line of Self-Priming centrifugals, diaphragm and plunger pumps - to give you - "More Gallons of Water for Your Pumping Dollar."



DISTRIBUTORS - If you are looking for a new line, with vigorous hard hitting selling support, contact us immediately. A number of territories are still available. Write, wire or phone.

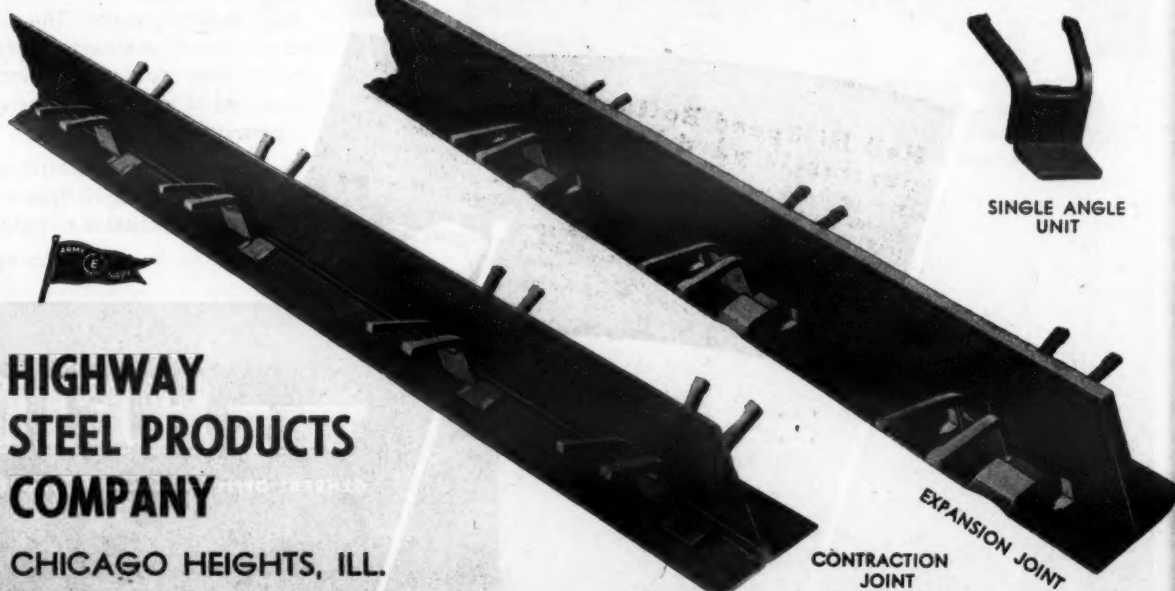


## BARNES MANUFACTURING CO.

Quality Pump Manufacturers for Nearly 50 Years

MANSFIELD, OHIO

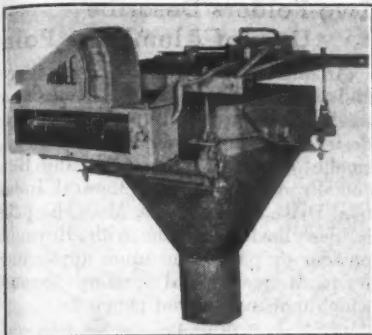
**TRANSLODE** Expansion and Contraction Joints have been giving excellent load transfer performance on thousands of miles of American pavements since 1932. Today's improved and simplified design retains the continuous base which makes installation easier and seals the joint against the infiltration of dirt from the soft subgrade. The weight of the joint has been reduced while the rigidity has been increased to make handling and finishing easier.



## HIGHWAY STEEL PRODUCTS COMPANY

CHICAGO HEIGHTS, ILL.





The Noble automatic weigh batcher.

### Automatic Batchers Center the Cement

One of the features of the Noble automatic batching plant, which can be dismantled, moved 5 miles, set up again and placed in operation in 16 hours, according to a contractor who owns one, is a cement hopper which spots the cement in the middle of the batch when dumping, giving a certain amount of pre-mixing and preventing cement dust from blowing. Through the use of the automatic batcher, these plants, made by the Noble Co., 1860 7th St., Oakland 7, Calif., permit high-speed batching which steps up production from 15 to 20 per cent over manually operated units. The multiple weigh beams control the weight of cement and aggregate in each batch accurately, as each beam is actuated in proper sequence by a photo-electric relay. The sequence of operation of the beams, however, can be readily changed in a few seconds when it is necessary to change the batch weight or the sequence of weighing.

The dribble gate for feeding the aggregates to the weighing batcher is pneumatically controlled through photo-electric relays. It feeds the aggregate into the weigh box at high speed at the beginning and then cuts the flow down as the final weight is approached. This guards against inaccuracy in weight at the final cut-off.

These plants may also be purchased with manual batchers in 3 and 4-gate models, with either steel or wood bins. The manual batchers are equipped with clamshell-type charging and dump gates for ease of operation and to prevent jamming.

Complete information on Noble portable batching plants will be found in an 8-page illustrated bulletin which may be secured without cost direct from the manufacturer.

### New Spotlight Aid To Welding Accuracy

The usual blindness of an arc welder before he strikes his arc can be eliminated by a new spotlight which will enable him to see the spot to be welded even through the smoked-glass window of his mask. This new light, developed at the Westinghouse Research Laboratories, casts on the work area a light twice as bright as the brightest sunlight although produced without creating much heat. This latter advantage is an important benefit to a welder working in a small booth in warm weather.

This new development employs a lamp of the sealed-beam type which throws 10,000 foot-candles light on work 3 feet away with an expenditure of only 32 watts, less than one-third that of an ordinary good reading lamp. It is expected that two lamps will be used to provide an over-lapping pattern, totaling 20,000 foot-candles. Since the light can be concentrated much better from a low-voltage lamp, the 110-volt supply is reduced to 6 to 8 volts by a small transformer built into the back of the reflector. These lamps can be clamped to a simple upright or arranged on a horizontal bar, and simple horizontal and vertical adjustments provide accurate placement of the beam spot. A foot-

switch makes it possible to turn the light on for an instant to locate the spot where the arc should be struck. For the protection of neighboring welders, a shield with a blackened interior extends some distance in front of the lamp.

Although this spotlight is still a laboratory development not commercially available, when it is placed on the market it should take the guesswork out of arc welding and add materially to the welder's comfort.

### Alemite Div. Returns To Remodeled Offices

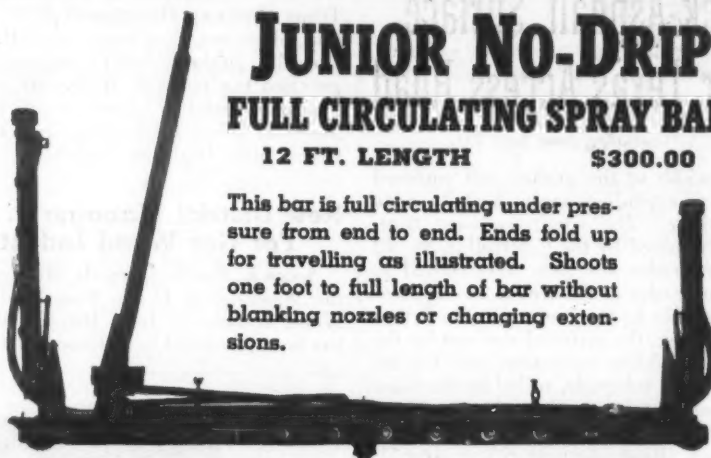
After sixteen months in temporary wartime quarters, the sales, advertising and service departments of the Stewart-Warner Corp., including the Alemite Division, have returned to remodeled offices in the company's main plant, 1826 Diversey Parkway, Chicago. This move marks completion of the second phase of the company's plan to concentrate all sales and administrative personnel in one general office building.

## JUNIOR NO-DRIP FULL CIRCULATING SPRAY BAR

12 FT. LENGTH

\$300.00

This bar is full circulating under pressure from end to end. Ends fold up for travelling as illustrated. Shoots one foot to full length of bar without blanking nozzles or changing extensions.



Write for literature on this bar and also the CARTWRIGHT HOT SPRAY BAR—AIR CONTROL and FIFTH WHEEL GOVERNOR.

CARTWRIGHT ASPHALT EQUIPMENT CO., Galion, Ohio



WAR WORK Today . . .

PEACE TIME CONSTRUCTION TOMORROW!

Let's get acquainted NOW—Write for your CATALOG today!

General excavation such as this being done by Frank Bryan, Inc., is typical of emergency war work handled by thousands of contractors where continued efficient shovel operation is essential. Tomorrow, when work of this nature is again "peace-time" construction you can put the same dependable performance on your excavating and material handling jobs. The rugged construction, simplified design, ease of operation and low-cost maintenance will make money for you. Right now, all production is going to the Armed Services but we would like to send you catalogs so you can get acquainted with BAY CITY equipment. Just write BAY CITY SHOVELS, INC., BAY CITY, MICHIGAN.



# BAY CITY

SHOVELS • CRANES • DRAGLINES • TRENCH HOES • SKIMMERS



## Rock-Asphalt Surface For Texas Access Road

(Continued from page 26)

foot width of the graded and surfaced section extending from backslope to backslope. The windrows were thoroughly mixed by the Caterpillar No. 12 motor grader and then were moved to the outer edge of the area to be surfaced. Brought in to the center in thin layers by blading, the material was wet by the same sprinkling equipment used for the compacted subgrade, rolled by the same sheepsfoot roller, and finish-rolled by a 10-wheel pneumatic-tire roller and an Ingram 10-ton, 3-wheel roller. One 3-inch course was completed on each section worked before the second was commenced.

### Rock-Asphalt Surface

MC-1 liquid asphalt, shipped from the Houston plant of the Humble Oil Refining Co., was heated by a Cleaver-Brooks tank-car heater and transferred in 1,000-gallon booster tanks to the road where a 1,000-gallon Hvass distributor applied it as a prime coat over the entire area of the flexible base at a rate of 0.25 gallon per square yard. This was allowed to cure for three to five days before the application, by the same distributor, of a tack coat of 0.10 gallon of RC-2 per square yard to the center 22 feet which was to be surfaced.

Rock asphalt was shipped in gondola cars from the Uvalde plant of White's Uvalde Mines to a convenient siding where a  $\frac{1}{2}$ -cubic-yard clamshell bucket on a Speeder crane unloaded it directly into the Ford and Chevrolet trucks which hauled loads of approximately 3 tons, weighed on commercial scales nearby, to the road. There the rock asphalt was dumped in a windrow down the center of the road and moved back and forth across the road by the Caterpillar motor grader to eliminate volatiles and moisture and to provide a uniform mixture and surface. The motor grader then spread the rock asphalt at the rate of 80 pounds per square yard to provide for a  $\frac{3}{4}$ -inch thickness after compaction. Initial rolling was done by a 3-ton and final rolling by a 10-ton roller, both of which were 3-wheel Ingrams.

The same distributor was then used to apply 0.55 gallon of 120 to 150-penetration asphalt per square yard in two courses to the shoulders, slopes and ditches. Each course was immediately covered by hand with crushed gravel at a rate of 1 cubic yard to 80 square yards for the first 0.25-gallon application of asphalt, and 1 cubic yard to 160 square yards for the remaining 0.30-gallon asphalt application. To insure uniform distribution, both hand brooms and a drag broom pulled behind a truck were used, followed by the lighter of the two rollers used on the rock-asphalt surfacing.

### Major Quantities

The major bid quantities involved in this contract were as follows:

Excavation	12,800 cu. yds.
Sprinkling	1,215 1,000-gals.
Rolling (flat-wheel and pneumatic)	289 hours
Rolling, sheepsfoot	153 hours
Flexible base	11,822 cu. yds.
Flexible base (on detour)	465 cu. yds.
Prime coat	12,105 gals.
120-150-penetration asphalt	8,754 gals.
Aggregate, cover coat	299 cu. yds.
Cold-mix rock asphalt	1,166 tons

### Personnel

This contract for grading, small drainage structures, flexible base, and rock-asphalt surface was awarded by the Texas Highway Department to J. O. Mack, Jr., Corpus Christi, Texas, on February 25, 1944, and operations were started three weeks later. The amount of the contract was \$44,862.03 and 60 working days were allowed for completion. D. B. Marrable was Superintendent

ent for the contractor, while for the Texas Highway Department B. C. Jenkins, Resident Engineer, and H. M. Hornsby, Junior Resident Engineer, supervised construction at the site under the administrative direction of F. S. Maddox, District Engineer, and D. C. Greer, State Highway Engineer.

### New District Manager For Gar Wood Industries

Amos E. Heath, formerly Manager of the Washington, D. C., Branch of Gar Wood Industries, Inc., Detroit, Mich., has been promoted to be General District

Manager of the Washington and Central Seaboard District. Mr. Heath has been with the company for the past twenty-two years, five as a salesman and seventeen as a branch manager.

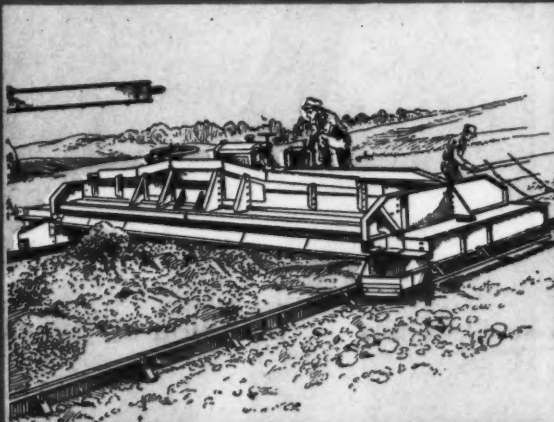
In his new position, Mr. Heath will serve as Gar Wood Industries' liaison with the armed forces and all government departments. He will also supervise all distributors, dealers and branches in the territory which consists of Maryland, Virginia, West Virginia, North Carolina and South Carolina. His office is located in Room 609-11 Defense Bldg., 1026 17th St., N.W., Washington, D.C.

### Two Folders Describe Uses of Aluminum Paint

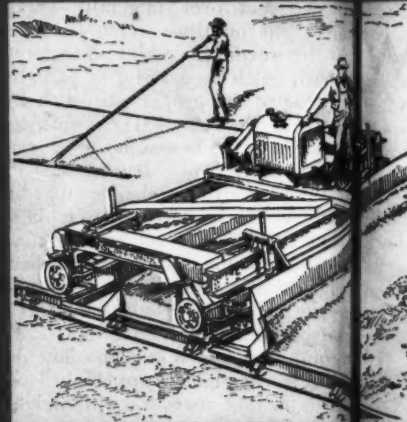
An aluminum paint to protect steel and wood surfaces from the effects of weather, smoke, acid fumes and other destructive elements is described in two small folders available from the Bitumcote Products Co., 1411 Central Industrial Drive, St. Louis 10, Mo. The paint is described as made with Reynolds powder or paste, and upon application forms a real metal coating through which moisture cannot penetrate.

Copies of this descriptive literature may be secured from the manufacturer.

# BLAW-KNOX HAS E ANSWERS



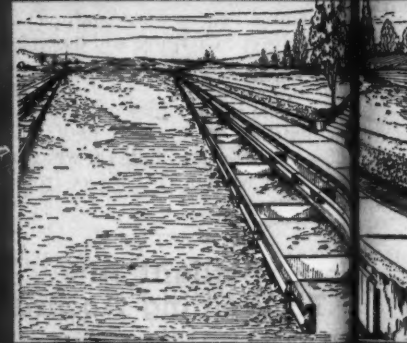
PAVING SPREADERS FOR ROADS AND AIRPORTS



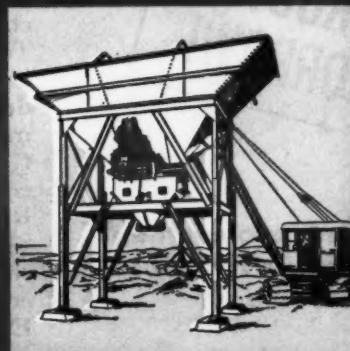
FINISHING MACHINES FOR ROAD AND AIRPORTS



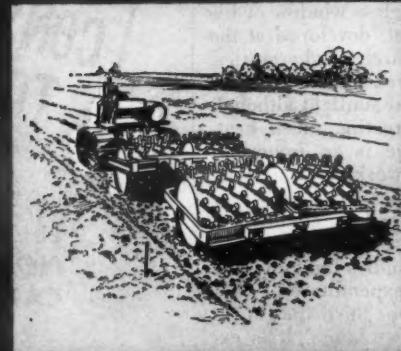
TRUCK MIXER LOADING PLANTS



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SHEEPSFOOT TAMPING ROLLERS



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### New Goodrich Handbook Of Heavy-Duty Tire Data

Selecting the right tire for the job, recommendations for proper care and maintenance of tires, and tire and wheel data of vital importance to all operators of rubber-tired equipment are some of the subjects covered in a comprehensive 96-page handbook issued by The B. F. Goodrich Co., Akron 18, Ohio. The book starts with a discussion of the synthetic-rubber tire situation, and in a later section gives instructions, with diagrams, for the proper mounting of synthetic tubes.

Perhaps of greatest interest to highway and construction engineers and contractors is the section devoted to off-the-road tires, including specification tables for tires to be used on tractors, graders, and similar heavy equipment. Factors which affect truck-tire life are covered in another section, which gives suggestions for good practice in operation and maintenance to secure best performance and longest tire wear.

This Operators Handbook, well indexed and of handy pocket-size format, may be secured upon request to the company and mention of CONTRACTORS AND ENGINEERS MONTHLY.

### Treating Bad Burns Out on Construction

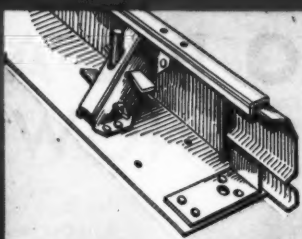
Quick relief from the pain and shock of bad burns and control of infection are reported from the use of a new chemical formula contained in Hydrosulphosol Ointment and Hydrosulphosol Solution, recently introduced to industry after six years of extensive clinical tests. In addition to the immediate soothing and antiseptic effect, this new sulfhydryl solution is said to accelerate healing and to help stimulate the natural restoration of injured tissue. Both the ointment and the liquid solution have been used success-

fully in hospitals for the past four years on all types and degrees of burns, and a number of leading medical journals have reported on tests and specific results. Besides alleviating pain and danger to workers, these new products should prove helpful in reducing losses in manpower and high compensation claims.

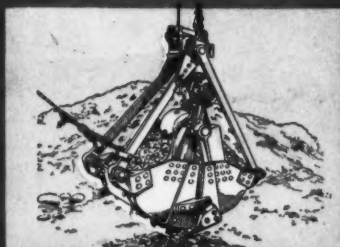
Bulletin 314, summarizing the values of Hydrosulphosol and indicating how to use it, may be secured from the Davis Emergency Equipment Co., Inc., 43 Hallock St., Newark, N. J.

Keep on buying War Bonds to speed  
Victory and Peace.

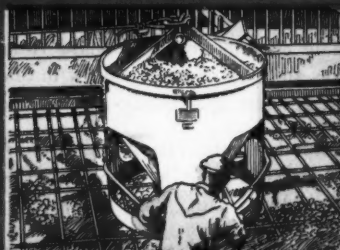
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# Rigid-Frame Bridge On U. S. 1 in Maine

## New Concrete Structure Replaces Pin-Connected Steel Truss, Removing Bottleneck in Houlton

THE Old Iron Bridge crossing the Meduxnekeag River at Houlton, Maine, has been replaced by a 3-span rigid-frame continuous reinforced-concrete structure, 168 feet long face to face of abutments. For more than fifty years, this lenticular pin-connected truss span has carried traffic on the important U. S. Route 1 along the northeastern border of Maine in the potato-growing county of Aroostook. Designed to carry a 10-ton load, the old bridge has been out of step with the times and modern bridge loadings. When it was built in 1893 by the Berlin Bridge Co. of East Berlin, Conn., it was fully adequate for the traffic of the period, but for the past decade or two it has been a bottleneck in the traffic flow through Houlton.

The old bridge was 170 feet 6 inches center to center of bearings, being made up of eleven panels spaced at 15 feet 6 inches, with a 22-foot clear roadway width between end posts, flanked by two 5-foot-wide sidewalks. The floor was wood. This was a standard-type bridge of the late nineteenth century, being patented in 1878 by Douglas and Jarvis, bridge designers. No riveting was necessary in its erection as it was an assembled job tied together by pins and bolted field connections. The abutments were cut-

granite ashlar masonry, the north abutment resting on piles and the south one on ledge rock.

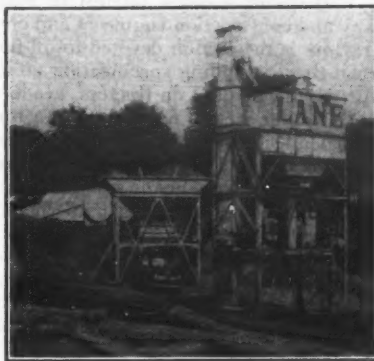
### New 3-Span Bridge

The new rigid-frame concrete structure has three spans, two end spans of 50 feet clear and a center span of 61 feet clear. The spans are each built on a vertical parabolic curve lengthwise of the bridge on the under side. The bridge section is 37 feet wide, 28 feet of which is clear roadway. Partially cantilevered at the sides are two 5-foot 10-inch sidewalks with a cast-in-place concrete railing. The bridge has a total width, including roadway, sidewalks and rail, of 42 feet and was designed for H-20 loading.

The old bridge was left in place during the construction of the new one so the contractor, the Lane Construction Corp. of Meriden, Conn., was not required to build a temporary bridge to maintain traffic. So closely were they paralleled that the new bridge barely cleared the truss members on the downstream side of the old bridge, and the sidewalk on that side of the old bridge had to be removed. The bridge axis is practically on a north-south line, with the river flowing easterly, to empty a few miles further on into the St. John River in New Brunswick, Canada. The village of Houlton is on the south bank.

### Foundation Work

Foundation work was started on the



C. & E. M. Photo

The Lane Construction Corp. batching set-up for concreting the new rigid-frame bridge over the Meduxnekeag River at Houlton, Maine.

footing of the northerly river pier which is 44 feet 6 inches long x 9 feet 8 inches wide x 6 feet 6 inches deep. A cofferdam of M115 steel sheet piling with a  $\frac{3}{8}$ -inch web and a nominal width of 19 $\frac{1}{8}$  inches per pile was driven. This was pumped dry by two 6-inch self-priming Humding-

ers, two 3-inch Homelites and one 4-inch self-priming Jaeger. The cofferdam was then excavated an average depth of 8 feet to Elev. 27. River boulders were broken by an Ingersoll-Rand pavement breaker and two Ingersoll-Rand jackhammers. About 150 feet of air hose led from a truck-mounted Gardner-Denver 105-cf air compressor. When the cofferdam was cleaned out, 58 wood piles were then driven and cut off at 3 $\frac{1}{2}$  feet within the footing. No seal was necessary.

The footing for the north abutment, which is 38 feet long x 8 feet wide x 7 feet thick, was next in order. This was intended to rest completely on piles, but a stratum of hard pan was struck when excavating for the downstream half of the footing, so a pile foundation for the complete footing was unnecessary. No sheet piling was required here inasmuch as this footing was located fairly well back on the stream bank. A few sand bags were stacked about 5 feet from the footing as a precautionary measure.

(Continued on page 92)

## ROTOBLADE SNOW PLOW



**Rotoblade**—The combination blade and rotary snow plow that accumulates and eliminates the snow in one operation. . . . It's NEW. . . . It's fast and reduces snow removal costs.

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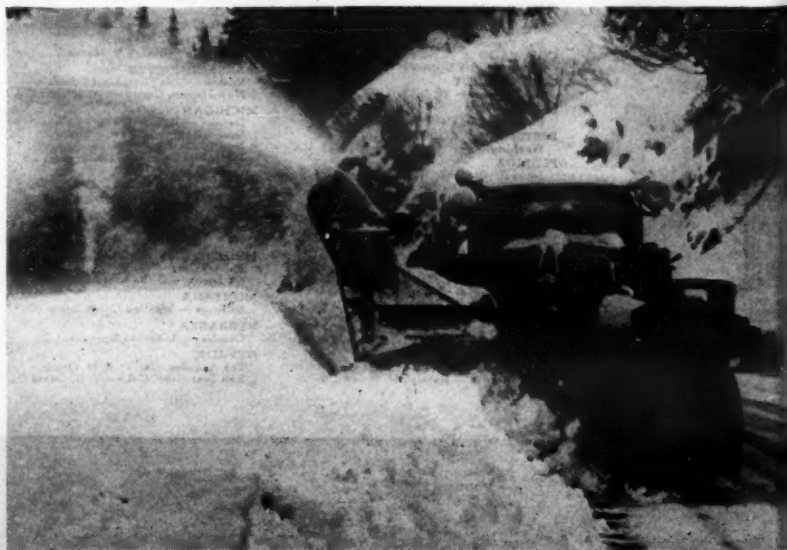
**Highways**—Rotoblade does the job better at about the same cost as a blade plow.

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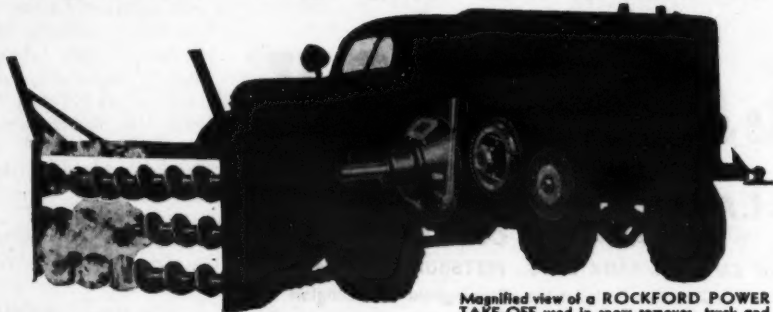
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Corps of Engineers Photo  
Gerard H. Matthes, Director, U. S. Waterways Experiment Station, recently received the War Department's Exceptional Civilian Service Award.

### Matthes Receives Award For Flood-Control Work

The Exceptional Civilian Service Award has been given by the War Department to Gerard H. Matthes, Station Director of the U. S. Waterways Experiment Station at Vicksburg, Miss., for his wartime direction of the Station and his work in protecting the Lower Mississippi Valley from floods. Announcement of the award was made by Brig. Gen. M. C. Tyler, President of the Mississippi River Commission, who was designated to make the formal presentation.

Mr. Matthes joined the staff of the Mississippi River Commission as an engineer in 1932, and participated in planning the cut-off program on the river which resulted in materially lowering flood heights at various points. Because of the success of this plan, it was unnecessary to construct a floodway in south Arkansas and north Louisiana, which had previously been considered essential.

Early in 1942 Mr. Matthes became the Director of the U. S. Waterways Experiment Station at Vicksburg which has contributed to the solution of many engineering problems for both the Army and Navy, and also conducted a series of experiments which led to the construction of the artificial harbors used in the French invasion.

Mr. Matthes, a native of Holland, is a graduate of the Massachusetts Institute of Technology and is regarded as one of the country's leading authorities in the hydraulic field. Before going

to Vicksburg, he was assigned to the Norfolk, Va., Engineer District, and had also been a New York consultant and a technical employee of various government units.

### Proceedings at Airport Management Conference

The Proceedings of the Southeastern Regional Airport Management Conference, held at the Alabama Polytechnic Institute, Auburn, Alabama, August 29, 30 and 31, 1944, have been published in a 77-page, paper-bound, mimeographed volume. Papers presented at the conference, covering important phases of airport construction and management, as well as discussions of the future development of aviation, potential post-war jobs in private flying, and legislation governing aviation, are reproduced, together with resolutions adopted expressing to the Aeronautical Engineering Department of the Alabama Polytechnic Institute, the Civil Aeronautics Administration, and the Alabama Aviation Commission the appreciation of members for making the meeting possible, and the hope that similar conferences may be held yearly for the benefit of all persons interested in aviation.

Copies of the Proceedings may be secured upon written request to Professor Robert G. Pitts, Head of the Department of Aeronautical Engineering, Alabama Polytechnic Institute, Auburn, Ala.

### Contractor Celebrates Hundredth Anniversary

Commemorating one hundred years of achievement in engineering and construction, James Stewart & Co., engineers and contractors of New York City, recently issued an impressive volume "A Century in Construction" which tells the story of this firm founded in 1844. Included in the book are photographs of the structures built by this company, among which are a number of state capitols, railway stations, the U. S. Chamber of Commerce Building in Washington, the U. S. Court House in New York, industrial plants, various sections of the West Side Express Highway in New York City, many bridges, power houses, wharves, docks, barge canals, locks, and similar facilities.

Its most recent work has been in war construction, its volume of business during the past twenty-two months approxi-

mating \$10,000,000 a month. Outstanding in these projects were the U. S. Naval Air Station at Trinidad, B. W. I., and the Naval Air Station in British Guiana; Sangamon Ordnance Plant in Illinois; facilities for a number of aircraft companies; and many shop buildings for expanding war industries. The company has received two Army-Navy "E" Awards.

The founder of the firm was James Stewart, descendant of a long line of Scottish builders, who came to this coun-

try in 1843 and the following year began the business which has survived him and his sons and now enters its second century of service handling a larger volume of construction than ever before. The present President and Chairman of the Board of Directors of James Stewart & Co. is Harry D. Watts who has been associated with the firm since 1924 and who, in December, 1943, received the U. S. Navy's Meritorious Civilian Service Award for his contribution to the war effort.

# GRIFFIN

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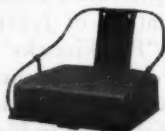
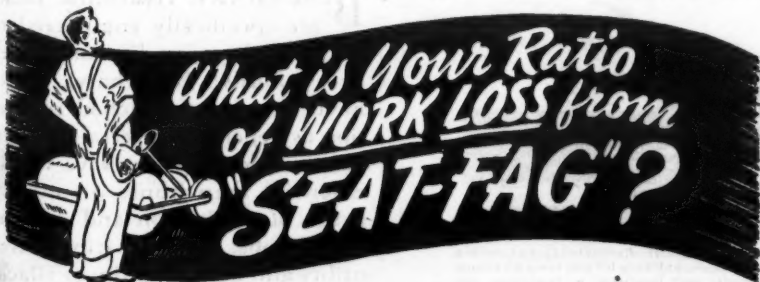
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## Wis. Highway Ready For Post-War Paving

Heavy pre-war traffic on and obsolescence of the two existing paved routes between Madison and Milwaukee led the State Highway Commission of Wisconsin to start work on improving a third existing undeveloped state trunk route between the same termini. Much of the improvement is on new location through highly developed agricultural land. The road is planned to permit ultimate development of a four-lane divided highway, though the initial work is limited to a single two-way pavement. Three contracts for grading the north lane of the proposed Trunk Highway 30, awarded in 1941, completed that item of work on the first 25 miles east of Madison, and the surfacing of the completed grade will be an early post-war project.

The first 11 miles of this location required comparatively light grading and was constructed with fill slopes of 4 to 1 and cut slopes of not more than 2 to 1

with the ends flared into slopes as flat as 8 to 1.

The remaining sections of the 30 miles on which grading has been completed lay through a rolling, heavily glaciated country of drumlins and marshes, requiring heavy grades. Cuts through the drumlins were several hundred feet long and reached depths of 60 feet. Fills across the intervening marshes required mucking operations to depths of 6 to 20 feet. Mucking was done by draglines, the material being side-cast, permitted to dry, and used to flatten the slopes of fills constructed of more stable material from the cuts. As is customary in Wisconsin, the width of mucking was determined by figuring a  $\frac{1}{2}$  to 1 slope outward from 3 feet beyond the proposed surfacing at shoulder grade to the bottom of the excavation and then a  $\frac{1}{2}$  to 1 slope upward and outward to the original ground surface.

A minimum right-of-way of 200 feet was secured and the north lane was graded with its center line 36 feet north of the center line of the wide right-of-

way. The layout will permit the ultimate completion of two lanes, each with a 22-foot concrete pavement, 8-foot gravel shoulders, and a median strip 50 feet wide.

Sodded flumes of widths and depths established by the drainage areas they serve were placed at the ends of cuts.

Despite the impossibility of constructing the cut slopes to currently accepted standards of streamlining, the flared ends have eliminated much of the trouble anticipated from heavy deposits of snow in the cuts. Another feature of planning and construction, introduced for an entirely different purpose, has proved surprisingly effective in the elimination of heavy drifting. Since the material through which the cuts were made was a sandy gravel subject to serious water erosion, many of the heavier cuts were benched in various widths, with a slightly reversed slope on the bench and drainage provided along it to the ends of the cut. These benches intercept a considerable amount of drifting snow which would otherwise obstruct traffic.

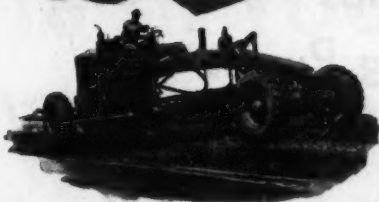
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● Exclusive features that save time and money by getting the job done better and quicker. "Plus values" built into every Austin-Western machine... values accumulated by engineering experience that has lived close to road building and earth moving problems and practices since the first crude Austin-Western tools of 1859.

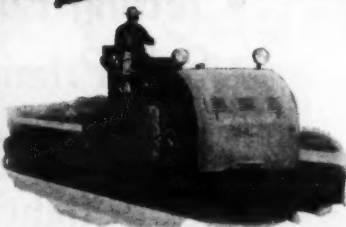
Features of design and construction "job tested" before the war... that have met the acid test of service on far-flung war fronts.

Your post-war Austin-Western machine may, or may not, resemble the model of today; but of this you can be sure... it will embody all the performance features of yesterday that have measured up to today's infinitely higher standards, PLUS everything that today is teaching us for tomorrow. More than ever it will be "Built to Outperform."

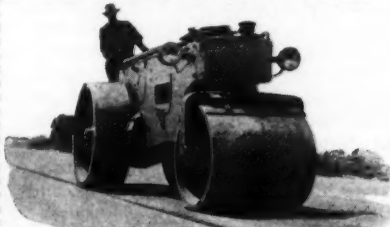
AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.



**MOTOR GRADERS**—Exclusive All-Wheel Drive and All-Wheel Steer enables the "99-M" and "88-M" completely to outperform ordinary motor graders.



**TANDEM ROLLERS**—Made in 2 sizes—5 to 8-Ton and 8 to 10½-Ton. The variable weight feature enables one machine to handle a wide variety of jobs.



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**BADGER SHOVEL**—Convertible to crane, dragline, piledriver, trench hoe, and skimmer. ¾-swing design has many operating advantages.



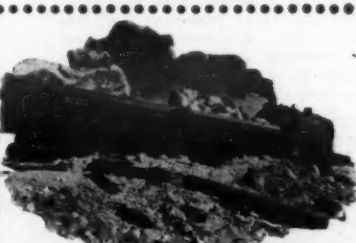
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Handle extends outward when jack is on side, permitting use close to floor.



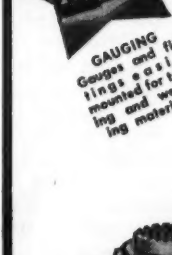
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Fast action, compact design, adapt Blackhawk Jacks to factory operations.



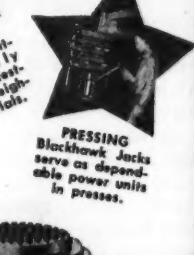
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## BLACKHAWK

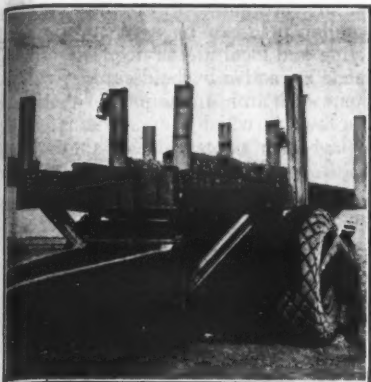
BLACKHAWK MFG. CO.,  
Dept. J1815, Milwaukee 1, Wis.  
Rush literature on Blackhawk Hydraulic Jacks for Industrial Uses.

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BUY MORE  
WAR BONDS





U. S. Engineers Photo  
A close-up of an 85-ton pneumatic roller, showing the ballast boxes loaded with steel billets and scrap rail.

## Giant Rollers

(Continued from page 37)

5 inches for contact surface. The drawbar was attached to a rectangular box-girder frame around the roller, the frame being suspended from the axle of the drum. As originally constructed, the entire roller weighed 26,600 pounds. With the drum filled with water, the initial weight was increased to 58,000 pounds, while when filled with wet sand in place of water the gross weight was 77,000 pounds.

The first test with this roller indicated that 48 feet were insufficient to accomplish satisfactory compaction, so additional feet were added, bringing the total number to 84. This was later increased to 156 feet. With these additional feet, the trips necessary to produce the required compaction were reduced to a reasonable number and the roller, due to progressive compaction, would eventually "climb out" until the feet penetrated to a depth of only 6 inches. Compaction of this final upper 6-inch layer was completed by use of standard sheepfoot rollers and a heavy rubber-tired roller for the top surface.

### Extra-Heavy Tire Roller

The heavy rubber-tired roller used in this work consists of steel boxes bolted together with an axle protruding from the side of each box. A dual wheel is mounted on each axle carrying two 24 x 32-inch 36-ply pneumatic tires. The boxes are equipped with a common A-frame which serves as a drawbar with a universal hitch to which a tractor can be attached. The steel boxes are filled with scrap steel billets to obtain additional weight. On occasion, the roller has been also ballasted with railroad rails so that the maximum gross load has been as high as 170,000 pounds.

This pneumatic roller is also used as a test rig to obtain data on the performance of runway pavements under load. The two boxes mentioned above are then separated by a third box which sets in between the others like the cross bar of the letter H. This increases the tread to a distance comparable to the tread of the largest bombing planes.

### Test Results

Although these two giant rollers have been in service but a short time, test results so far show their usefulness. On the first job where the giant sheepfoot roller was used, the following construction test results were obtained:

Depth	Relative Compaction	
	Before Rolling	After Rolling
0 to 24 inches	80 per cent	95-101 per cent
2 to 18 inches	70-80 per cent	90-102 per cent
6 to 12 inches*	67-72 per cent	82-92 per cent

\*(For the top 12 inches, standard equipment plus pneumatic-tire rollers are needed.)

Tests on material rolled with the giant pneumatic-tire roller give the following results:

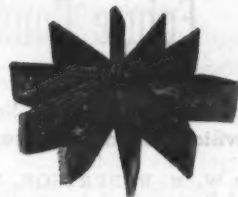
Depth	Relative Compaction	
	Before Rolling	After Rolling
0 to 6 inches	80-85 per cent	94-101 per cent
6 to 12 inches	(Aver. 81 per cent)	(Aver. 93 per cent)
	75-89 per cent	89-91 per cent
	(Aver. 83 per cent)	(Aver. 90 per cent)

Although tests during construction are continuing, the foregoing information has been made available at this time in the hope that it may be of assistance to other agencies having similar problems. The results described were incidental to actual construction where speed of accomplishment was vital, according to the Sacramento Office, U. S. Army Engineers. Comprehensive tests on other subgrade materials and with various combinations of loading and numbers of feet are still required to develop full efficiency of this "super-colossal" equipment.

### New Chain Hoist Bulletin

An attractive 12-page bulletin describing and illustrating the Chester line of chain hoists and trolleys has just been issued by the Chester Mfg. Co., Lisbon, Ohio. The care and use of such equipment is also covered. Copies of this 8½ x 11-inch book, "The Chain Hoist of Tomorrow, Today and Yesterday", may be secured upon application to the company.

## Each Dipper Tooth made GOOD AS NEW in only 30 Seconds!



Shovel digger teeth wear rapidly. Particularly in rocky soil and gravel where they are subjected to excessive abrasion, shock and impact.

To make the teeth of buckets more wear-resistant, to keep them sharp longer and avoid frequent replacements, many companies are relying exclusively on Coast Metals Hard-Facing. Applied to the teeth, as well as lips, runners and other parts, it successfully protects these vulnerable points so that the bucket functions more effectively, more quickly, and at a significant saving in power. After the teeth become slightly worn, they are then given another Coast Metals Hard-Facing and once again made good as new . . . in only 30 seconds!

Coast Metals Hard-Facing meets today's needs for making all machinery, equipment exposed to severe wear last longer. Easily applied by the electric arc or gas torch to any ferrous metal including manganese steel, alloy steel, cast iron and chilled iron. New revised edition of Form X-201 goes into full detail. Write for your copy today.

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Endurance in Case industrial tractors comes not from novel features but from a policy of making every part a bit better than might seem necessary. It includes choice of quality materials, ample dimensions and liberal allowance for load stresses. In particular it means

exceptional care in design to keep out destructive dirt and to provide effective lubrication. Case endurance comes from tractor-building experience that began in 1892.

Ask your Case industrial distributor . . . or write us . . . for actual records of tractor endurance in conditions comparable to yours. There are four basic sizes of Case industrial tractors, covering completely a weight range from 2500 pounds to more than 10,000 pounds. Besides their endurance in regular push-pull work, their extra strength makes them ideal power plants for mowers, brushes, loaders, cranes, winches, and other mounted equipment. J. I. Case Co., Racine, Wis.



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**In Business to Serve You** • Your Case industrial distributor makes a business of supplying and servicing the kind of tractor power and allied equipment that fits the needs of your business and of your location. Backed by the records, experience and engineering talent of the Case Industrial Division he is qualified to give competent counsel on the choice, care and operation of industrial machinery.



## Our Airport Needs, Future Construction

Some 6,700 Communities Will Plan Various Facilities to Serve 300,000 Civilian Aircraft in 4 Years After War

By W. M. ROBERTSON, Manager, Second Region, Civil Aeronautics Administration, Atlanta, Ga.

† THE first concern of every sizable community which does not want to be left out of the aviation picture of the future should be to provide itself with adequate airports. This applies to some 6,700 towns and cities with a population of more than 1,000 people. The post-war plane will be of little value if there is no place to operate it within a reasonable distance of one's home. Further, the local airport must be equipped with gasoline pumps, telephones, transportation, eating places, and, preferably, sleeping accommodations.

Airport planning must be done on a national basis to give the private pilot the assurance that no matter where he, or she, wishes to go, there will be an airport waiting at the end of the flight. At present, when a trip is planned, the flier must first check to see if there is any airport at all at the destination, for today we have slightly in excess of 3,000 airports.

It has been said by many unhappy pilots of the past that, when a community decides to build an airport, a careful survey of likely spots is made until one is found on a riverbank where fog will gather, next to a railroad yard to catch all the smoke, surrounded by high-tension lines, and at least 15 miles from town, with no transportation, no telephone, no food, no water, and no one in sight. While obviously exaggerated, there is unfortunately some truth in this picture. When a pilot lands, he does it for a definite reason. He wants to refuel quickly and be on his way, or he wants to get food, or he has a reason for going to the nearby city and wants to get there without needless and exasperating delay.

An airport many miles from the community is not a convenience, nor a necessity, but a virtually useless stretch of paving or sod, a benefit to very few. Location is all important in airport planning. A sod strip in the shape of a T, or an L, may do for a start. If it is convenient, gives service, and is handled properly, it will get the traffic necessary to keep it growing.

The airport is the key to the problem of aviation development, just as the highway was the basis for automotive development. The growth of our great automobile industry would not have been possible without a large-scale aggressive program for the construction of hard-surfaced roads. The growth of private flying and air transport is equally dependent on the development of an adequate airport system.

The Civil Aeronautics Administration is now completing a \$400,000,000 program of building airports to meet the needs of the armed services. As a result of this program, which was begun three

years ago, the United States acquired some 600 new or vastly improved airports, almost all of which will be permanently useful in civil aviation.

But it is already obvious that, if we stop here, civil aviation will be seriously impeded because of inadequate ground facilities. Today we have 3,086 airports.

The report the CAA is preparing for Congress shows we shall need double that number within five to ten years after the war, plus improvement of 1,625 of the existing fields.

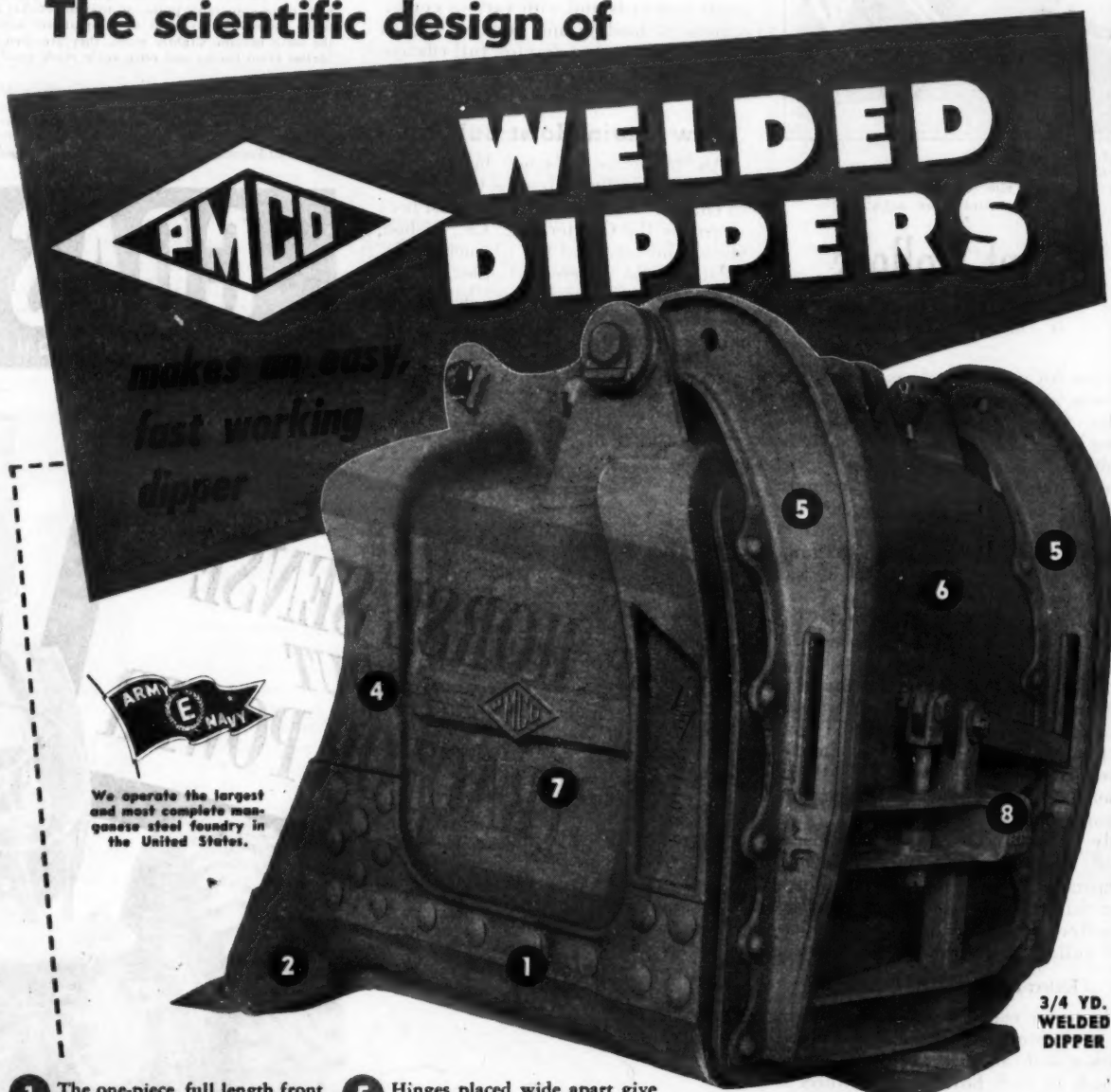
### Airport Classification

The airports we need fall into two

major categories. First, there are the smaller fields to be used for personal flying and local air service. These fields, made attractive by landscaping, will become such an intimate part of the life of the town in which they are situated that it has been suggested that they should

(Concluded on page 86)

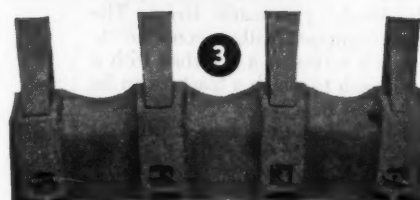
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We operate the largest and most complete manganese steel foundry in the United States.

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- 2 Teeth located in extreme outer corners of lip assures wide bites which reduce digging resistance of lip.
- 3 Tapered socket type teeth are kept tight continually by digging pressure, but are easily removed by light tapping from behind. No stress on the key at any time.
- 4 Cradle in digging side permits easy handling of large rocks and concrete slabs too big to enter dipper.

- 5 Hinges placed wide apart give greater strength to the door and are set ahead so that door has easy and positive latching.
- 6 Curved door eliminates usual void or "hard-to-fill" corners of the square box type dipper. Failure to get a completely filled dipper wastes about 10% capacity.
- 7 Tapered sides and back and the curved door provide a large discharge opening that assures faster dumping — saves time in handling wet, sticky material.
- 8 Latch mechanism is of very heavy duty construction. Latch keeper is cast integral with front and has easily renewable wearing piece.

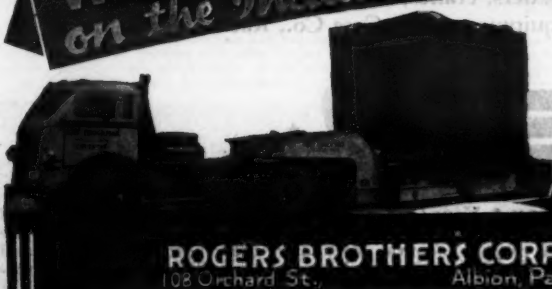


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- ★ We must salvage paper normally thrown into the waste basket.
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## Ohio Acquires Sites For War Memorials

The unsatisfactory results with memorial tree plantings following World War I and the resulting criticism of all highway agencies, state, county and township, in Ohio, has led the Ohio Department of Highways to promote and sponsor another and more useful type of war memorial on which construction will begin after the war is ended.

The Ohio Department of Highways now has approximately three hundred roadside parks fully developed and in use. Dallas D. Dupre, Jr., Landscape Architect of the Department, states that a like number of new parks will be required after the war in order to fill the gaps and serve the traveling public. He asks, "What better living memorial can such an agency sponsor?" It is felt that

the answer is "none" and so the Department, under Hal G. Sours, Director, is going ahead on this basis.

Ohio does not buy sites for roadside parks except in cases of highway relocation, when a tract may become available. Sites are obtained by the regular highway easement method. This procedure makes an ideal set-up for local organizations, communities, or individuals to secure suitable sites, have them approved by the Department of Highways, turn them over to the State, and then plans for detailed development can start at once.

The Ohio Department of Highways will develop the sites with necessary facilities, will erect a suitable bronze marker memorializing the particular hero, battle, victory, etc., and will properly landscape the highway approaches to the park. Then all maintenance will

be done by the Department of Highways.

Even now there are some thirty sites donated for this purpose and others are being offered and investigated from week to week. One of the two large state garden club associations is enthusiastic about the idea as contrasted with avenue tree planting.

## Air Compressor Catalog

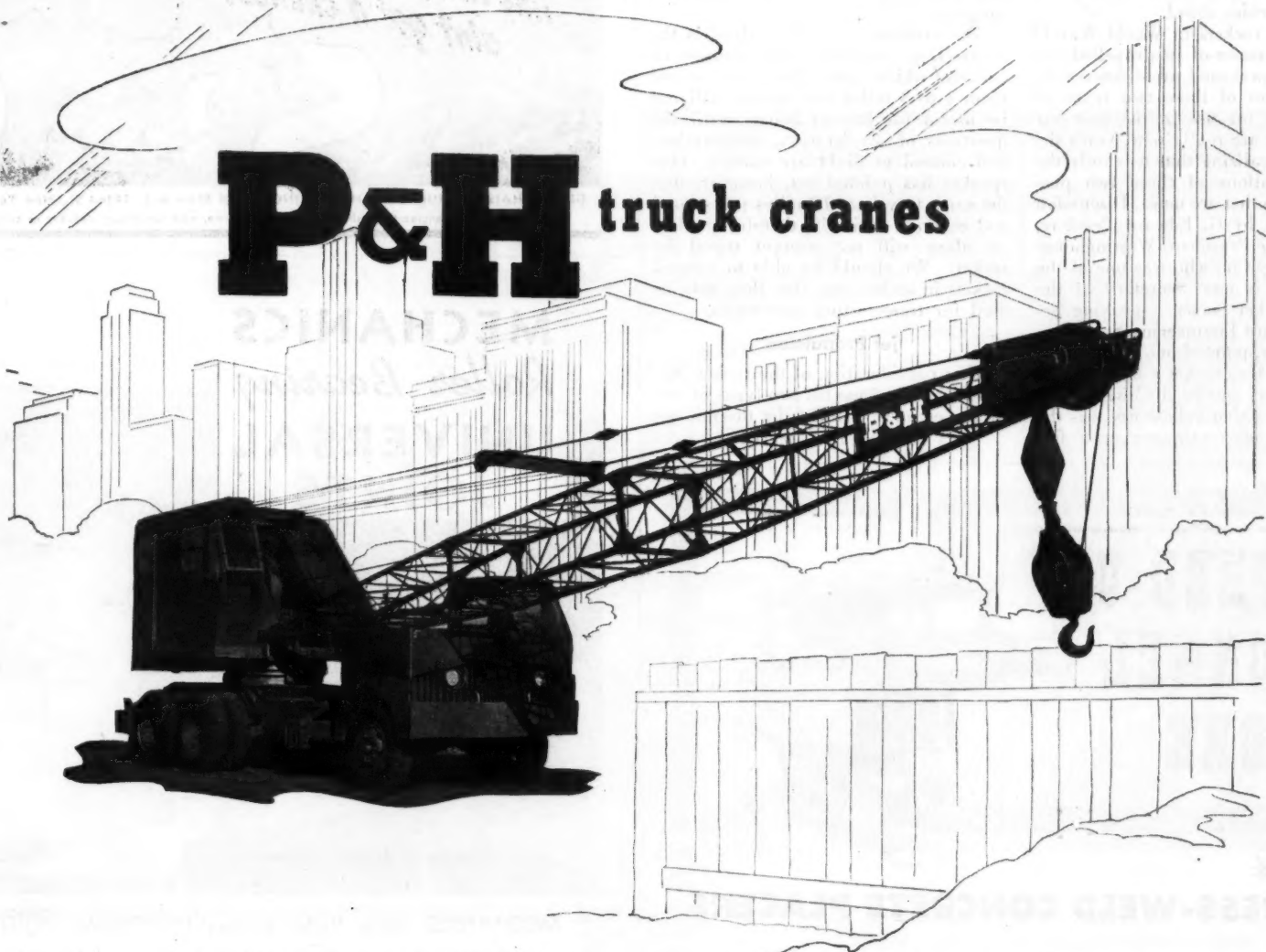
A new 16-page illustrated catalog has recently been published by the Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y., describing Mobil-Air, a two-stage air-cooled air compressor. A detailed description and diagrams show the advantages of this unit which has a convertible engine, making possible either gasoline or oil operation.

Copies of this catalog may be obtained

by writing to the manufacturer and asking for Form 3074.

## Barnes Mfg. Appoints New Sales Engineer

The appointment of Ray C. Nesbitt as Sales Engineer has recently been announced by the Barnes Mfg. Co., Mansfield, Ohio, maker of a line of contractors' pumps. Mr. Nesbitt, who for the past two years has been connected with the Construction Machinery branch of the War Production Board in Washington, D.C., has had wide sales and engineering experience in the construction field, and before his Washington assignment was associated with the Phillips Machinery Co., construction equipment distributor in the Middle Atlantic states. He will be located at Barnes' headquarters in Mansfield.



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**ALL AROUND THE TOWN!**

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# The Post-War Boom Of Jet Propulsion

**Rockets Used 700 Years Ago and Jet Propulsion At Start of Christian Era; Post-War Possibilities**

✦ NEXT to the question "When will the war end?", the one asked of us most frequently is "What new device or method will come out of this war to produce a new industry or revolutionary process?" The first word which comes to the layman's mind is "electronics" with its infinite number of possibilities. This science has been known for many years, but during the war it has made tremendous strides ahead.

The use of rockets in World War II and the appearance of jet-propelled airplanes have awakened great interest in the possibilities of these two types of motive power for use in the post-war years. "They are really new," says the layman, not realizing that it is only the useful applications of these two propelling devices that are new. Discussion of the subject by G. Edward Pendray, Assistant to the President, Westinghouse Electric & Mfg. Co., who was one of the founders and is now Secretary of the American Rocket Society, speaking before the Harvard Engineering Society in New York City, pointed out that it is believed that the true rocket was developed about 700 years ago by a Chinese who, under the belief that yellow fire was the hottest, substituted saltpeter in a fire

arrow for the common salt used by the Greeks in their fire arrows. By 1804 the rocket had been developed as a military weapon and was actually used at Boulogne, Leipzig, Danzig, and Waterloo. The "rockets' red glare" mentioned in our own national anthem refers to British military rockets.

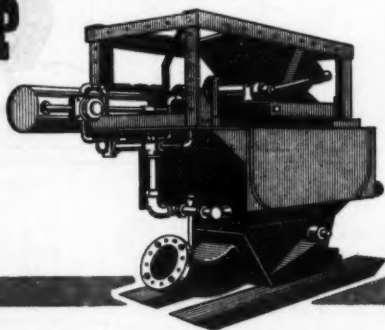
Undoubtedly there will be a rocket industry in the post-war years, with specially designed rockets using liquid fuels to aid planes in taking off, as it is known that the greatest amount of power used by a plane is at the take-off and it is this power which limits the payload. Rockets will be used for sounding purposes, as they can be fired to great distances in the air to explore the stratosphere and make possible the creation of three-dimensional weather maps. Mail and express may be delivered by rockets traveling in trajectories as much as 300 or 400 miles in length and thus could possibly compete with planes for that purpose.

The problem yet to be solved is the controlling, steering, and landing of rockets, which, since they may travel from 1 to 3 miles per second, will not be useful for human beings until the questions of acceleration, deceleration, and control in flight are solved. One speaker has pointed out, however, that the earth travels at 19 miles per second and we don't notice it; therefore, velocity alone will not prevent travel by rocket. We should be able to control rockets in such a way that they may be used for transporting passengers.

## Jet Propulsion

After consideration of the rocket, Mr. Pendray said, come the two types of air-stream engines, namely the thermal jet (Concluded on page 90)

## SPEED UP TUNNEL WORK



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Tunnel-lining job records show as high as 2,526 cu. yards placed in 24 hours with a single PRESS-WELD placer!

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A Western contractor recently placed over 20,000 cu. yards with a total maintenance and repair cost of less than \$100!

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Concrete placed with PRESS-WELDS on the Delaware Aqueduct job average 5,000 lb. test strength... 2,000 lbs. over the average of concrete placed by other methods. PRESS-WELDS eliminate segregation of aggregate, resulting in dense, tight concrete free from voids and leaks.

NOBLE Company designs and builds all types of tunnel forms and tunnel concreting set-ups.

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Bucket agencies throughout the country. Write, wire for prices, delivery or catalogs.

## MECHANICS Roller Bearing UNIVERSAL JOINTS



MECHANICS makes Roller Bearing UNIVERSAL JOINTS in several sizes, the largest of which is husky enough to drive the heaviest duty power take-off machine. Our 3 RA universal joint is strong enough to stall any tractor. It now is available with the "Standardized hitch." Let our engineers show you how these sturdy MECHANICS Roller Bearing UNIVERSAL JOINTS can help increase the capacity of your new or improved earth moving machines.



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### Wet Spongy Roads Corrected in Mass.

The problem of subsurface water collecting under sections of highways and resulting in wet spongy conditions is one which faces many state and county highway engineers. An example of remedial construction is found in two strips of highway near the Town of Sandwich, Mass., reported on recently by L. R. Sellew, District Highway Engineer at Middleboro for the Massachusetts Department of Public Works.

This section of road often became a danger zone during the spring and winter, and following prolonged rainstorms. One side of the road was skirted by a high steep slope which carried subsurface water to the highway and flooded it. Eventually this water found its way under the surface, causing the subgrade to become wet and spongy. Test pits dug alongside the highway revealed a stratum of soil through which the subsurface water was leaching into the subgrade. Engineers decided to install a pipe drainage system along the extent of the highway shoulder where trouble arose.

Vitrified-clay Skip-Pipe, a recent development of the clay-pipe industry resulting from joint pioneering by the Robinson Clay Product Co., Akron, Ohio, the W. S. Dickey Clay Mfg. Co., Kansas City, Mo., and the Dimick-Moshier Products Co., Boston, Mass., was used. A trench about 3½ feet deep was excavated and 2 inches of stone placed on the bottom. On this base, Skip-Pipe was installed and the trench backfilled with stone to within 1 foot of the surface. Next a layer of heavy paper, burlap, and cloth bags was placed, followed by several inches of coarse gravel. Topsoil from the original excavation was used to fill in the last 6 inches, and finally the surface was seeded.

Mr. Sellew reports, "The following winter we took particular notice of these sections, and, since these installations have been made, the highway sections have been entirely dry. . . .

"We made an investigation of the outlet . . . one day, after three weeks during which no rain had fallen and a very decided, although small, stream of water was trickling out of the Skip-Pipe and into the basin."

Vitrified-clay Skip-Pipe is especially designed to handle the problem of permanent fast-flowing subsurface drainage. Because of its cradle design construction, the manufacturer states that it starts flowing sooner and continues to discharge longer. A complete new folder, covering this product in detail in its adaptation to highway drainage, may be secured direct from the Robinson Clay Product Co. or the W. S. Dickey Clay Mfg. Co.

### Branning Made Gen. Mgr. Of Wood Shovel & Tool Co.

On November 1, E. H. Branning took over the post of General Manager of the Wood Shovel & Tool Co., Piqua, Ohio, according to a recent announcement. Mr. Branning has a wide and varied background of experience, and in 1942 was requested by the government to organize and head the Hardware and Tools Procurement Division of the Army Service Forces, where he served until he re-

signed to assume his present position.

Previous to his government work, Mr. Branning was connected with the American Fork & Hoe Co., Cleveland, Ohio, the CKR Co. of Cleveland, and other well-known firms in the middle west.

### Reflectorized Signs For Highway Traffic

Many highway departments are anticipating the need for new and more easily read highway traffic and direction signs to care for the upward surge in post-war traffic. The Cataphote Corp., Wall St., Toledo 10, Ohio, has recently issued a new 24-page illustrated catalog on Cataphote signs with reflector buttons for both wood and metal types. The catalog also shows Niteway Outliners, such as are used on the high-speed Pennsylvania Turnpike, and center-lane reflecting markers.

Copies of this catalog and bulletin may be secured by writing direct to Cataphote and mentioning CONTRACTORS AND ENGINEERS MONTHLY:

## CONNERY'S HEATING KETTLES

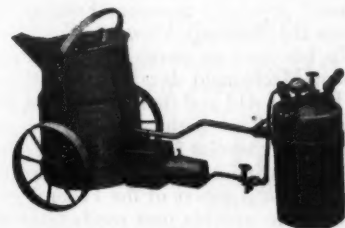


Speed up work by using a Connery Heating Kettle for building and maintaining highways, airports, barracks and roads. Made in sizes of 30, 80, 110 and 165 gallons.

Send today for our complete catalog showing our full line of Tar and Asphalt Heating Kettles, Spraying Attachments, Pouring Pots, etc.

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## CLEVELAND H66 SINKER

the little fellow with the BIG WALLOP!



### "TAILOR MADE" Cleveland Catalog

Let us send a catalog built especially around your own rock drill requirements—no extra pages to thumb through and take up valuable time. Tell us the type of rock drill or other pneumatic machines you are interested in—we'll send a catalog to supply the information you want.

NEED a light, easily-held, air-saving sinker for soft or medium rock? The Cleveland H66 fills the bill perfectly. Strong rotation by this 32 lb. model carries even 12-foot drills down full length in any ground. And compressors pop off more often with Cleveland H66's on the hose lines.

The H66 has drop forge construction, swivel air connections, and strong steel puller easily opened by hand. Fast, efficient automatic valve, renewable chuck bushing, and patented lock nuts to keep side rods tight are other important features. Standard chuck: ⅞" hex. x 3¼" collared; quarter octagon also obtainable.

Bulletin 122 describes this drill in detail as well as many larger models of Cleveland Sinkers. Ask for it!

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## Federal-Aid System Reviewed by AASHO

(Continued from page 12)

eral-Aid Legislation", prepared by Senator Carl Hayden of Arizona, was read in his absence by Bernard Touhey, State Highway Engineer of Arizona. R. H. Baldock, State Highway Engineer of Oregon, read a paper "Federal Aid From the State Viewpoint" and then Commissioner of Public Roads MacDonald presented a paper "Federal Aid From the National Viewpoint".

In his opening paragraphs, Commissioner MacDonald developed the theme of Federal Aid and its beginning as follows: "Federal highway aid from the national viewpoint is a logical and effective compromise between exercise of the constitutional power of the Federal government to provide post roads interconnecting the states, and complete abandonment of that power in recognition of the fact that the principal usage of all highways is by traffic of generally intrastate range. Its success as a policy has depended upon a clear recognition of the predominant state interest and a voluntary restraint of the Federal power within limits defined by the partial interstate concern. Its conspicuously beneficial results have been achieved through a balanced partnership of the executive ability of efficient state highway departments and the capacity of a Federal organization, trained by long experience to observe the trend of changing needs and propose accordant change of policy."

"The Federal agency was created as the Office of Road Inquiry more than half a century ago to investigate and to teach. As the Public Roads Administration, investigation is still the larger part of its function, and, though its individual pupils now grown to man's estate are often ahead of the teacher, it still tries to keep a page ahead of the class in conning the lessons of the combined experience."

"In 1901 it established a road-material testing laboratory and began a study of the qualities of available road-making materials that in time encompassed practically every type of material to be found in all parts of the country and led on to the earliest studies of new and untried methods of road building with bituminous and cement binders."

"Meanwhile, some of the states, following the lead of New Jersey and Massachusetts, had been experimenting with the new method of encouraging and improving the practice of county and other local road-building effort through state financial aid administered by state highway departments. By 1904, such aid had become an established and continuing practice in sixteen states."

"From the successful demonstration of the effectiveness of state and local government cooperation, it was a short step to the conception of a similar cooperation between the Federal and state governments and the first definite suggestion of Federal Aid was made in the same historic year of 1904. From that year onward, the new idea was never absent from the deliberations of the Congress, leading in eight years to the crystallizing action of 1912, by which the trial appropriation of \$500,000 was made and a Joint Committee on Federal Aid in the construction of post roads was appointed."

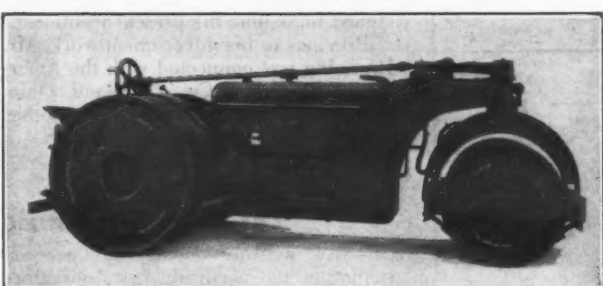
After tracing the history of Federal Aid, Commissioner MacDonald said:

"Largest credit for the substantial progress made in highway improvement in the two decades between 1912 and 1932 is essentially due to the fast-developed and present high efficiency of the state highway departments. From small beginnings these departments have developed engineering and administrative organizations outstanding among public agencies for the businesslike conduct of

their operations, organizations that have never failed to meet the ever-increasing and changing demands that have been made upon them. Their adaptability to changed conditions was amply demonstrated by the many alterations of objective and administrative procedure required by the exigencies of the depression during which they proved themselves able to conduct a work relief operation of large dimensions with minimum sacrifice of the efficiency of their normal construction processes."

"In the established relationship of the Federal and state highway agencies and the tested provisions of the Federal Highway Act, the Federal government found instruments ready to hand requiring only slight adjustment of the apportionment provision and increase of the Federal participation, with which to employ immediately hundreds of thousands of men in useful work. The tasks of highway construction provided were found in their distribution through the country to be peculiarly adapted to the

(Continued on next page)



What's  
different  
about  
this  
**THREE-WHEEL  
ROLLER**  
?

The wheels (rolls) are cast hollow and are fitted with portholes so they can be filled with water or sand—thus increasing the weight of the roller to produce more ground pressure when needed—a very desirable feature.

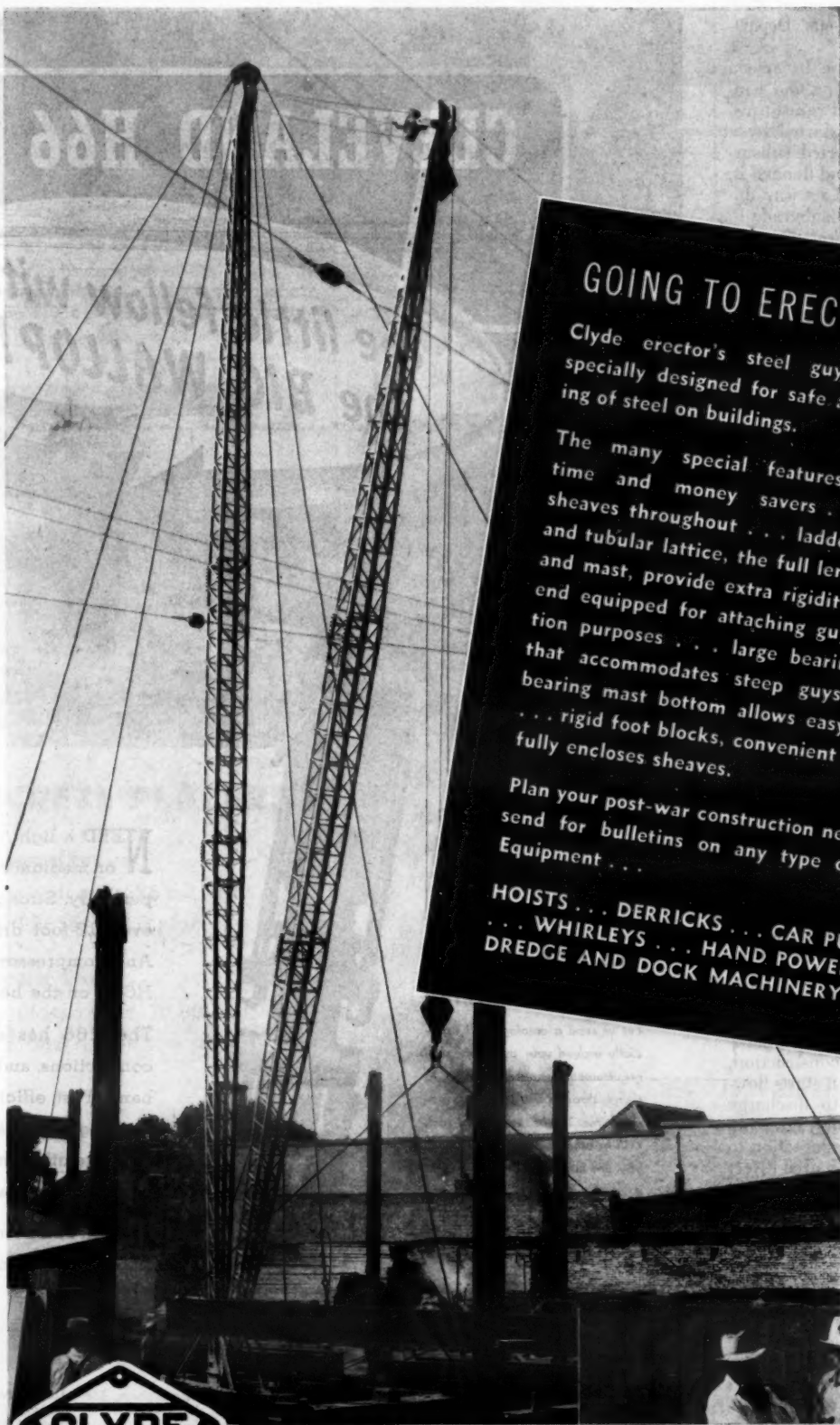
*Variable Weight—that's the answer!*

Other important features are its ruggedness, its easy steering, its clear vision, and operator-comfort.

FOUR SIZES: 4-5 ton, 5-8 ton, 8-10 ton, 10-12 ton. WRITE FOR LITERATURE.

Manufactured by

**J. E. INGRAM EQUIPMENT CO., 1146 W. Laurel St., San Antonio 6, Texas**



*Plan now  
for the job  
you'll do  
tomorrow!*

### GOING TO ERECT STEEL?

Clyde erector's steel guy derricks are specially designed for safe and easy erecting of steel on buildings.

The many special features are proven time and money savers . . . self-oiling sheaves throughout . . . ladder type angle and tubular lattice, the full length of boom and mast, provide extra rigidity . . . boom end equipped for attaching guys for erection purposes . . . large bearing guy cap that accommodates steep guys . . . roller bearing mast bottom allows easy swinging . . . rigid foot blocks, convenient to handle, fully encloses sheaves.

Plan your post-war construction needs now, send for bulletins on any type of Clyde Equipment . . .

**HOISTS . . . DERRICKS . . . CAR PULLERS  
WHIRLEYS . . . HAND POWERS . . .  
DREDGE AND DOCK MACHINERY.**



**CLYDE IRON**  
DULUTH, 1

**WORKS, INC.**  
MINNESOTA



## PRA Chief Outlines Federal-Aid History

(Continued from preceding page)

supply of work opportunities in approximately the proportions in which the need was distributed. The record of employment afforded, begun in 1931 and kept continuously since, shows that in the fourteen years following, Federal-Aid state highway construction and maintenance provided over 3,600,000 man-years of direct job employment, and estimates based upon careful investigation indicate that this was coupled with a generated off-site employment amounting to at least 6,000,000 man-years in the equipment and material supply industries and in transportation.

"This carefully kept record has produced very valuable data indicative not only of the general value of highway work as a relief measure, but also of the manner in which its employment potentialities vary with such factors as type of construction, methods of operation, location of work and the season in which the work is performed.

"It was the recognized employment potentialities of highway construction that gave rise in the middle 1930's to the first extension of Federal Aid to the construction of secondary rural roads and the improvement of trans-city connections of the Federal-Aid highway system. It was the same need and circumstances that led at the same time to a substantial increase of the previous pace in elimination and protection of highway-railway grade crossings."

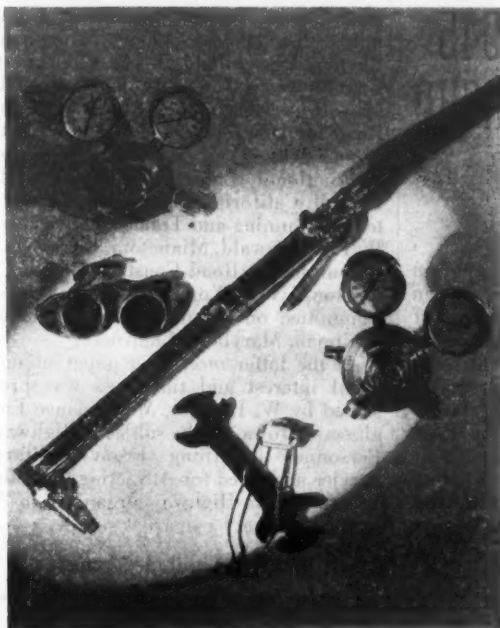
The value of the highway planning surveys, the purpose of which was to supply dependable facts where there had been at best informed opinions, made possible the conclusive negative answer given by the report "Toll Roads and Free Roads" to a resurgent demand for transcontinental toll roads and permitted first formulation of the sound alternative proposal of a system of interregional highways as primary routes within the Federal-Aid system, to be constructed by the tried processes of Federal-state cooperation.

In concluding his paper the Commissioner said, "In addition to providing for the immediate construction of access roads and the most urgent necessities of the strategic network, the Defense Highway Act made the first definite provision for the advance planning of post-war public works. This permitted an early start to be made upon the planning of post-war highway improvements and together with the later provision for the use of unobligated balances of Federal-Aid construction funds previously authorized, gave definite stimulus to the assembly of an imposing list of planned highway projects. As of October 1, the states had completed plans for post-war construction valued at \$398,000,000, an increase of about \$30,000,000 in the preceding month. The states also had designs under way for work to cost \$1,162,000,000, an increase of \$44,000,000 during the month, and surveys were under way on additional work estimated to cost \$1,065,000,000. The cooperation of the states in readying their highway programs for immediate post-war launching is encouraging to the prospect of their early translation into reality.

"Once again, a generation later, the pause of war has provided the opportunity for the appraisal of new highway needs in addition to the new accepted concept of the continuing need for replacement construction on all road systems. Once again, we are in a critical period of highway history—on the threshold of a new period or change which will involve an expanded scope of operations, new concepts of highway standards and related facilities and new measures of highway service that have only to be exemplified to be demanded.

The automotive traffic of twenty years hence will utilize and highly benefit by the broad and ample facilities embodied in the Interregional Highway System, characterized by free and unimpeded travel between major centers of population and including the free-flowing city-penetrating and circumferential routes. This is no more than that projected primary Federal-Aid system which will accommodate at least a fifth of the nation's traffic on one per cent of its road mileage. Concurrently, the major face-lifting operation which will need to be performed if we are to render our cities livable will be enhanced by the development of comprehensive metropolitan-area expressway systems. And in the other direction, the smaller veins to feed these arterial ways will be protected by the selection and sustained improvement of a very important and substantial mileage of the Federal-Aid secondary system, perhaps that one-fifth of the nation's mileage which will contribute social value transcending its traffic service.

(Concluded on next page)



### This One Will Stay On the Job Longer

Often a good cutting torch prevents a costly shut-down of operations.

You cannot purchase a more dependable cutting torch—or one of wider range—than Victor.

**Victor Equipment Company**

844 FOLSOM STREET  
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**VICTOR**

Ad 104

J. A. Gallagher, Madison, Wisc., contractor uses a Universal 546-P primary unit with 20" x 36" jaw crusher in Viroqua, Wisc. quarry. Plant is electric-powered.

Below: Beu & Sons use a 546-P primary unit with 20" x 36" crusher for primary reduction of limestone at Ackley, Iowa. Secondary plant has No. 4 Universal Pulverizer.



The 30" x 42" Welded Steel Plate Roller Bearing Crusher on this 546-P Primary Unit increases output for Art Overgaard's No. 1 plant at Cashton, Wisc. This is the third 546-P unit purchased by this operator.

Quarries step-up output with this  
**UNIVERSAL**  
Primary Unit!

These Universal Portable Primary Crushing Units greatly increase output for quarries because larger chunks of shot rock need not be rejected or sledged. In addition, they increase the output of secondary crushers by delivering material of a more uniform size to them.

Made in four sizes: 16" x 24", 20" x 36", 24" x 36" or 30" x 42" jaw crushers. Apron feeder empties onto bar grizzly with bypass chute for material suitable for secondary unit. Apron feeder can be readily detached and slid off onto a truck to facilitate hauling. Ideal for use with Universal 822-Q, 410-Q, 880 and other plants as well as other makes of quarry plants that need to be geared to tomorrow's requirements. Send for details.



**UNIVERSAL ENGINEERING CORPORATION**  
620 C Ave. West, Cedar Rapids, Iowa

**UNIVERSAL**

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADER-ROLLERS, PORTABLE ASPHALT PLANTS

This and other Universal Advertisements are appearing in Leading Construction and Quarry Publications!





## New Officers for 1945 Installed by AASHO

(Continued from preceding page)

ice."

### Federal Aid in the Future

The second portion of the program "Looking Ahead" was devoted to an appeal by Wilson Wyatt, Mayor of Louisville, Ky., for greater attention to the need of the cities in the handling of traffic using Federal highways, a similar appeal from the county's standpoint by Otto Hess, County Engineer of Kent County, Mich., and a concluding paper "Future Highway Development From the State Viewpoint" by C. W. Phillips, Commissioner of Highways of Tennessee.

On Tuesday evening the delegates and visitors with their guests attended the annual Family Dinner which was followed by a varied floor show.

### Committee Meetings

All day Wednesday and Thursday morning were devoted to group sessions where engineers and officials interested in similar subjects, but with varied opinions, discussed their problems in detail and at times with heat. These group sessions included the Committee on Public Relations and Publicity, C. W. Phillips, Tennessee, Chairman; Committee on Maintenance and Equipment, R. H. Baldock, Oregon, Chairman; Committee on Right-of-Way, L. W. Kern, Maryland, Chairman; Committee on Uniform Accounting, Gordon Lloyd, Texas, Chairman; Committee on Road Design,

H. C. Coons, Michigan, Chairman; Committee on Bridges and Structures, Raymond Archibald, PRA, Chairman; Committee on Materials, F. V. Reagel, Missouri, Chairman; Committee on Roadside Development, John L. Wright, Connecticut, Chairman; Committee on International Highway Relations, C. H. Purcell, California, Chairman; Committee on Planning and Traffic Engineering, W. F. Rosenwald, Minnesota, Chairman; Committee on Road Construction, E. C. Lawton, New York, Chairman; and Committee on Administration, Ezra B. Whitman, Maryland, Chairman.

At the latter meeting a paper of unusual interest and timeliness was presented by W. H. Root, Maintenance Engineer of Iowa, on the subject "Highway Personnel Returning From Military Service and Need for Attracting Capable Young Men to Highway Organizations", based on a very extensive survey.

### Plea for Limited Access

At this same session, Hal G. Sours, Ohio Director of Highways, speaking on "Express Highways in Cities" said, "Expressways approaching and entering cities should be located either on blighted or undeveloped property as much as possible, leaving the existing streets to serve local traffic. Interchanges should be located only at the principal traffic distribution points.

"The most urgent problem today and in the immediate future in many states," according to Mr. Sours, "is that of providing adequate traffic facilities in the urban areas, particularly those of metropolitan character. We need in these areas highways which will collect, carry and distribute large volumes of traffic quickly and safely. The peak-hour conditions in many such areas have almost

hopelessly snarled traffic on the existing facilities.

"Limited access or expressways provide the logical solution. The progressive highway engineer, planner and official will waste little time in the future trying to solve major urban highway problems through the means of street widening. Major street-widening projects usually involve disproportionately large right-of-way and damage costs and the functional advantages gained are often disappointing."

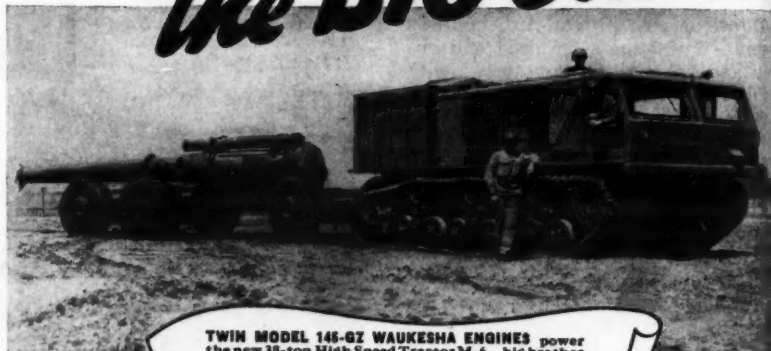
Mr. Sours pointed out that undesirable commercial development along highways can best be avoided by limited access, as merely relocating a highway through undeveloped property without restricting the access only defers local traffic interference. Expressways should be designed and built to facilitate the rapid and safe movement of traffic, Mr. Sours said. In conclusion, he stressed the importance of suitable legislation which will grant authority to the state, the city, and the county to establish expressways with limitation of access.

### New Officers

The Thirtieth Annual Meeting of the American Association of State Highway Officials closed with the Thursday afternoon session, November 30, with the formal reports and the election and installation of the new officers for 1945 as follows:

President, Herman A. MacDonald, Commissioner, Massachusetts Department of Public Works; First Vice President, Hal G. Sours, Director, Ohio Department of Highways; Regional Vice Presidents, Ezra B. Whitman, Chairman, State Highway Commission of Maryland, C. W. Phillips, Commissioner, Tennessee Department of Highways and Public Works, Wesley W. Polk, Chief Highway Engineer, Illinois Division of Highways, and Burwell Bantz, Director of Highways, Washington Department of Highways; Treasurer, G. H. Henderson, Principal Highway Engineer, Division of Roads and Bridges, Rhode Island Department of Public Works; Executive Secretary, Hal H. Hale, Washington, D. C.

## bringing up The BIG GUNS



TWIN MODEL 145-GZ WAUKESHA ENGINES power the new 35-ton High Speed Tractor M-6... big brother to the M-4 which has a single Waukesha Engine of the same model. The engine is designed and built by Waukesha Motor Company, and both tractors are designed and built by Allis-Chalmers in cooperation with the Army Ordnance Department. Official U.S. Army Photograph

### ...WITH WARTIME WAUKESHAS!

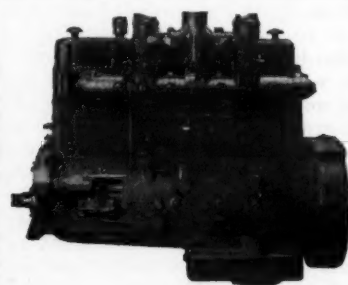
First things first... and first things fast. To our American artillerymen that means superiority of fire power—and moving up the big guns in a hurry!

The giant artillery tractors start rolling. Powered by wartime Waukesha Engines... no road is too rough... no terrain too tough. Up come the 8-in. guns and the 240 mm. howitzers... into position... and it's all over but the shooting...

American fire power, amazingly accurate and deadly destructive, pounds the enemy defenses to pieces. It's all deeply depressing to enemy army morale.

No ordinary engine gives M-6 and M-4 Military Tractors their power to pull—their smoothness and swiftness. It's a wartime Waukesha—Model 145-GZ—a super power plant built by Waukesha to out-power and out-perform any similar engine of the same size ever produced!

Every Waukesha Engine will be a wartime engine, until V-Day. Then there'll be Waukesha peacetime engines for your special requirements. Write Waukesha engineers now about your future engine needs.



MODEL 145-GZ WAUKESHA ENGINE

Six cylinders, 5 1/2 in. bore x 6 in. stroke, 817 cu. in. displ. Burns gasoline... is designed to use modern aviation fuels... develops high output. And it's really rugged! Crankcase and cylinder block cast as a single unit. Crankshaft is drop-forged steel, heat treated. Wet sleeve cylinders easy to remove and replace. Positive pressure oiling with built-in oil cooler. Thermostatic by-pass system maintains efficient operating temperatures, and assures quick warm-up when starting.

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# WAUKESHA ENGINES

## Twenty-two REASONS Why FLEX-PLANE Dummy Joints are Necessary in Modern Concrete Pavements

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FLEX-PLANE joint installing machines eliminate messy hand methods. Install all types of joints... ribbon, poured, pre-moulded, etc., with or without VIBRATION.

- Ask for Equipment Specifications •

FLEXIBLE ROAD JOINT MACHINE CO. WARREN, OHIO



## Concrete Patching In Wayne County

Older East-Bound Roadway  
Of Ford Road in Dearborn  
Repaired by County Crew;  
Truck-Mixed Concrete Used

MAINTENANCE forces of the Wayne County, Mich., Road Commission have recently repaired a 3-mile stretch along the southern half of the dual-roadway Ford Road located in the north central section of the city of Dearborn. The roadways are 10-inch-thick 30-foot-wide plain-concrete pavements separated by a grassy park area. The southern, or east-bound, half was constructed in 1925, while the northern, or west-bound, half was built twelve years ago and is in no need of repairs.

Wayne County maintenance engineers made a visual survey of this road and marked off the areas to be patched with a painted outline. These patches vary in size from a small 4 x 4-foot area to a section 10 feet wide x 160 feet long; the size of the average patch was 10 x 30 feet. The maintenance crew, of which there are six in Wayne County, consisted of fifteen men. The road was closed during the repair work but no interference with traffic resulted as the 30-foot-wide northern half of the dual highway could temporarily accommodate traffic in both directions.

The concrete in the areas to be patched was broken up by the Michigan Foundation Co. using a pneumatic hammer mounted on a truck. This pavement breaker cracked and loosened the concrete sufficiently so that it could be loaded by a Byers gas shovel into two county-owned 4-yard trucks which hauled it to a nearby brickyard where it was wasted in an old clay pit. The patch holes were trimmed around the sides with an Ingersoll-Rand pneumatic hammer powered by an I-R compressor.

### Concreting

On the return trip from the dump area, the county trucks picked up a load of sand from a pit in the vicinity to put in the subgrade after all foreign material had been carefully cleaned out of the holes. This yellow sand was compacted by hand tamping to fill any depressions and bring the subgrade of the patch level with the bottom of the surrounding concrete.

Dry concrete batches were purchased from the American Aggregate Co. batching plant at Greenfield Road about 5 miles from the site of the work. Two county-owned Jaeger truck mixers were used to haul and mix the concrete which was chuted into place, using steel forms on the outside. Finishing of the concrete was done entirely by hand.

After the finishing, the concrete was covered with burlap and kept wet overnight with water supplied by a 200-gallon tank trailer which was filled from adjacent hydrants. The burlap was removed and washed the following morn-

ing and the concrete was covered with Sisalkraft paper to continue the curing process.

### Personnel

Leroy C. Smith is County Highway Engineer for the Wayne County Road Commissioners, with John K. Norton,

Engineer of Highways. The concrete patching was under the supervision of M. N. Brown, General Superintendent, while M. O'Connell was Foreman of the maintenance crew.

*Waste paper goes to war too. Be sure to turn yours in for salvage.*

### Robbins to Colombia Post

James M. Robbins has been appointed technical representative of The B. F. Goodrich Co. at the new Colombian Tire Co., in Bogotá, Colombia, which is nearing completion. Mr. Robbins has been with Goodrich since 1928.



*Spectacular isn't a good word to use in speaking of Pierce Governors for Diesel engines.*

● The fundamental idea of good governing is simply keeping the engine and the equipment it powers going along in a pretty dull routine . . . keeping it from doing anything "spectacular."

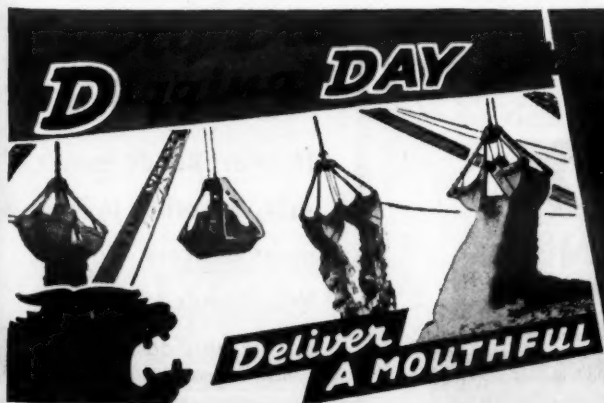
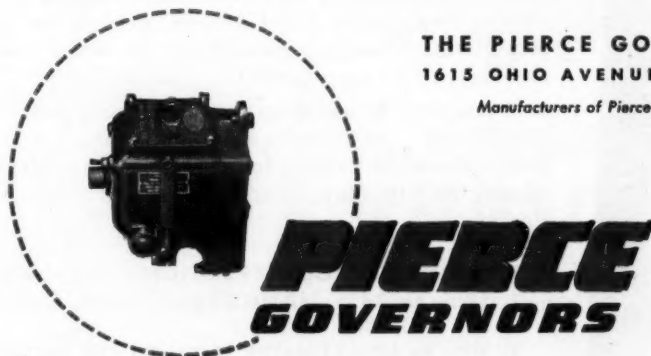
And Pierce Governors do an excellent job of keeping excitement out of the job—whether it be a marine, road building, electrical power generating or general construction operation. They are unfailingly dependable, through the time-proven flyball

design, in holding the engine speed constant—within narrow limits—against varying load conditions. They allow full power required—but constantly guard the engine against destructive overspeed and abuse. And they last for a long, long time with minimum service requirements.

Pierce Governors for Diesel engines may be had in either of two types—driving directly from the fuel pump shaft, or driving independently of the fuel pump. Consult Pierce engineers with any Diesel governing problem. They have sound knowledge from years of practical experience in governing all kinds of engines.

THE PIERCE GOVERNOR COMPANY, INC.  
1615 OHIO AVENUE • ANDERSON, INDIANA

Manufacturers of Pierce Governors and Sisson Automatic Chokes



### Change of Address

(Mail to Contractors and Engineers Monthly, 470 4th Ave., New York 16, today)

From \_\_\_\_\_  
(Former address)

To \_\_\_\_\_  
(New address)

Name \_\_\_\_\_

Firm \_\_\_\_\_

Position \_\_\_\_\_



## Engineered Design, Designed Engineering

Engineers must know more about and give more attention to esthetics in design and be ready to work with the modern architectural or industrial designer, according to Professor J. K. Finch, Associate Dean of the School of Engineering at Columbia University, speaking before the Metropolitan Section, American Society of Mechanical Engineers. "At the same time," Professor Finch stated, "the modern designer must certainly know more about engineering unless he is satisfied with a false, make-believe, pseudo-functional type of design."

In a paper entitled "The Evolution of Design", Professor Finch said that the modern trend in design involves both the engineer and the artist, but it "very clearly originates in the approach and methods of the engineer. The modern designer, industrial, architectural, or artistic, cannot undertake functional design with success unless he has a keen

and clear understanding of the engineering approach to design. Functionalism leads only to funnyism unless it is based on understanding."

## New Electric Plants Are Available Now

Announcement has been made by the Construction Machinery Co., Waterloo, Iowa, that many of the models in the new CMC line of electric generating plants are available now and can be sold and delivered promptly under existing WPB regulations and priorities.

These new plants, in capacities ranging from 350 watts to 25,000 watts ac and 600 to 6,000 watts dc, have been tested and proved with our armed forces all over the world. Series 1B, of 500 to 1,000 watts ac or 1,500 watts dc, is especially designed for miscellaneous applications where a moderate amount of current is needed. Where portability is important, there is the Series OTC of 1,500 to 2,000 watts, while the Series

W2C includes rugged sturdy units to meet a demand for continuous heavy-duty service. The Series W4 and W6 are completely enclosed units mounted on skids for speedy transportation and are particularly adapted to construction jobs or emergency service.

Further details on these CMC electric generating plants may be secured by contractors and state and county highway engineers direct from the manufacturer. Just mention this item.

## Contracts Let for Repair Of Government Equipment

Government-owned heavy construction equipment, much of it returned from overseas construction projects, is being repaired under twenty-four contracts let in the state of Washington, according to an announcement from the office of Major E. H. Rausch, Jr., Supply Officer, Seattle Engineer District. After reconditioning, the equipment will be sent to Engineer depots and troop training centers.

Among the firms holding contracts for this work are A. H. Cox & Co., and Sundfelt Equipment Co., of Seattle; Webb Tractor & Equipment Co., Yakima, Wash.; and the Hofius-Ferris Tractor & Equipment Co., and Fred M. Vilas & Co. of Spokane. All of these companies are established distributors of construction equipment.

## COST-CUTTING- PROFIT-RAISING **SYNTRON** Dependable **ELECTRIC HAMMERS**



3600 BLOWS PER MINUTE

**Drilling,  
Cutting and Chipping  
Concrete and Masonry**

—AND—

*Pulsating-Electromagnet*

**CONCRETE FORM  
VIBRATORS**



**Save Concrete  
Speed Up Placing and  
Setting**

*Write for illustrated folders*

**SYNTRON COMPANY**  
227 Lexington Avenue  
HOMER CITY, PA.

**20% to 40%  
lighter...**  
*type for type*

**Permits use of larger volume  
bucket on your machine . . .  
regardless of normal capacity!**



Here's the bucket every excavating contractor and dragline operator has dreamed of and wished for. A bucket that's light yet strong, unsurpassed for wet or dry digging, easy to handle, and with inbuilt durability to give years of trouble-free service. Light enough, even in the larger sizes, to maintain allowable loaded weight when used on small machines or on long boom.

If you want to speed up your operations under all digging conditions . . . move more material faster . . . you need Hendrix Lightweight Buckets for your draglines. Write today for descriptive literature, specifications and prices or ask your dealer.

1. ALL WELDED CONSTRUCTION . . . no rivets
2. 10% to 14% MANGANESE STEEL CHAINS and FITTINGS
3. 20% to 40% LIGHTER THAN OTHER BUCKETS, type for type
4. GETS FULL LOAD OF PAY MATERIAL EVERY TRIP even in wet digging
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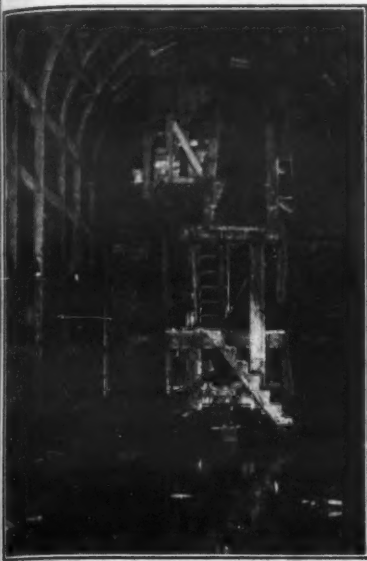
**HENDRIX**  
*Lightweight*  
**DRAGLINE  
BUCKETS**

DESOTO FOUNDRY, INC. • MANSFIELD, LOUISIANA

## BONDS

If War Bonds aren't safe, no other investment matters. So buy War Bonds with every dollar you can find.





The east portal heading of the Boscman tunnel, with the jumbo in place for drilling. Note the steel ribs with roof lagging.

that a blast was about to be fired, was strung from a connection provided in the light and power circuit on the left at the portal to a locked switch at the portal end of the right-hand blasting line. Only the General Superintendent and Night Superintendent carried keys to the blasting switch so that the presence of one of them was necessary before any blast could be fired.

As soon as a round had been shot, an immediate inspection of the mainline tunnel was made by a man from the Assistant Engineer's office and the dispatcher notified that trains could proceed safely. All the induced-draft fans were started at full capacity and in 30 to 40 minutes the air in the tunnel was sufficiently free of noxious fumes to permit the start of mucking operations.

#### Mucking

A Speeder  $\frac{3}{4}$ -cubic-yard electric shovel, having one corner of the cab and the counterweight cut away to facilitate turning in the close quarters of the tunnel, was then moved in to the

working face. This shovel first moved into the muck pile on the right side, clearing a passage and side dumping the rock on top of that on the left. The shovel then returned to the left side, was carefully spotted so that its back end could swing between the vertical posts, and loading to the four diesel-powered Mack trucks commenced. The haul averaged 1,200 feet from the portal to the waste area and since space did not permit turning inside the tunnel it was necessary for the trucks to back to the right side of the shovel.

Mucking time was dependent to some extent on the size and arrangement of the broken rock in the muck pile as well as the skill of the operator working in the limited available space, but under average conditions a 14-foot round was mucked out in 10 to 12 hours, including the time required for smoke clearance and moving the shovel in and out and the jumbo back to the working face, all of which was charged against mucking time. Since the excavated area contained a volume of approximately 23.1

cubic yards per linear foot in the section with timber ribs and 21.3 cubic yards per foot where steel ribs were used, plus the yardage of unavoidable over-breakage, this mucking time cannot be considered excessive in view of the equipment it was necessary to use and the limited space available for its operation.

#### Timbering

With the mucking completed and the jumbo returned to the working face, timbering was started. For a distance of 1,000 feet from the east portal, ribs of 12 x 12-inch timbers were set. These consisted of pairs of independent vertical posts cut from 22-foot pieces, with five segments cut from 12 x 12's 6 feet long, their ends cut to the proper angle, arched from post to post to form the roof ribs and 4 x 6-inch lagging set parallel to the center line of the tunnel from rib to rib, solidly across the roof of the tunnel and along the side walls where loosened rock made it advisable. For the first 40 feet of the tunnel, the

(Continued on next page)

## N-P Railroad Tunnel Driven in Montana

(Continued from page 16)

Before loading was commenced, the 440-volt light and power circuit, which extended down the left-hand line of posts below the 22-inch ventilation line and above the 2-inch water and 6-inch air line, was disconnected from the jumbo and illumination for the loading operations was furnished by floodlights set approximately 50 feet back from the working face.

#### Shooting the Face

When all holes were properly loaded and connected by bus bars, the jumbo was pulled back to a safe distance, all workmen left the tunnel, and a request for permission to blast was relayed to the train dispatcher through the Assistant Engineer's office telephone. When the permission was obtained, firing was done through a special 440-volt blasting line strung down the posts on the right-hand side of the tunnel (the side opposite that used for the light and power circuit). A temporary connecting wire, which incidentally served as a barrier across the portal warning all present



### 2 in 1 SHOVEL BOOM SAVES COST OF EXTRA PULL SHOVEL BOOM

A new idea in small shovel design, built into the new Koehring 205. You save approximately  $\frac{1}{2}$  of the cost of the pull shovel attachment because the same boom handles both dipper and pull shovel. You save in everyday operation because boom stays in place, cutting change-over time to the minimum. 100% welded and of box type construction, the 2-in-one boom works at top efficiency in either conversion.

KOEHRING COMPANY, Milwaukee 10, Wis.

With the new Koehring 205 you can travel, hoist, swing and raise or lower the boom... all at the same time. Contact your Koehring distributor today. Find out how the Koehring 205 fits into your post-war plans.

Orders Accepted NOW  
For Post-war Delivery...



HEAVY-DUTY CONSTRUCTION EQUIPMENT

For HOSE  
BOOTS, CLOTHING or  
PUMP DIAPHRAGMS

Call YOUR  
Continental  
BRANCH

Immediate Delivery  
from Local Stock

#### BRANCHES

Baltimore	Kansas City
Boston	Los Angeles
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Cleveland	Philadelphia
Dallas	Pittsburgh
Dayton	Rochester
Detroit	San Francisco
Indianapolis	St. Louis

CONTINENTAL  
RUBBER WORKS

ERIE, PENNSYLVANIA, U.S.A.





The west portal heading of the new Northern Pacific Railroad tunnel near Bozeman, Mont., showing the timber lining set and the jumbo in place to drill the bench.

## Railroad Tunnel

(Continued from preceding page)

posts rested on 12 x 12-inch wall plates.

All this timber, previously cut to pattern, was hauled into the tunnel on a Chevrolet flat-bed truck, raised by a Sullivan air hoist mounted on the top deck of the jumbo, and finally man-handled into position by the shift on duty. Rib spacing varied from 4 to 8 feet as decided by responsible authority. The grade of the vertical-post bottoms, which of course fixed that of the top of the timber arch, was obtained by wedging from the rock floor and checked by carpenter's level from grade nails set by instrument in the previously placed ribs. Lining up of the posts was done by sighting along the ends of 1-foot lightweight chains, previously set by instrument in the collar braces already in place and held out horizontally from their anchorages by the men doing the lining. Wedging from the walls moved the posts to their correct positions and any later tendency to squeeze in at the bottom was overcome by 1-inch drift pins grouted into the solid-rock floor inside the vertical posts. Pins were used only infrequently where side pressure was encountered or expected.

### Use of Steel Ribs

In the east 989 feet of the tunnel, 158 timber ribs were set, after which permission was obtained for the use of

steel ribs made from old 100-pound rail. This substitution represented considerable economy as excavation outside the neat line of the concrete lining was reduced 1.8 cubic yards per linear foot from that required to place the wood ribs, and consequently less concrete is required to refill this additional area when lining is done. The average of 400 fbm of permanent timbering per foot of tunnel, furnished by the railway, was considerably reduced by the substitution also, although the time required for handling and placing the ribs was not altered greatly.

These steel ribs, used throughout the remainder of the tunnel until unstable roof conditions were encountered, which necessitated the use of a top-center drift, were delivered in two pieces each 34 feet 6 inches long, their top ends bent properly to form the roof arch, with the ball of the rail on the inside of the curve and the upper ends drilled for the 2-foot long  $\frac{3}{4}$  x 3-inch plates used to connect them in position. Connection angles of fish plates, later omitted, and 6-inch x  $\frac{3}{4}$ -inch x 6-inch butt plates were welded to the top end of the rails. Bearing plates, 9 x 12 inches in area and  $\frac{3}{4}$  inch thick, were welded to the rail ends for base plates, and five 4-inch pieces of  $2\frac{1}{2}$  x  $2\frac{1}{2}$  x  $\frac{1}{4}$ -inch angle were welded to the outside of the ribs at equal intervals to form supports for lagging in case it was needed. Holes were also drilled through the rail web for the insertion of fourteen  $\frac{3}{4}$ -inch tie bolts furnished with each section, and used, with the 4 x 6-inch collar braces inserted between the ribs at each tie bolt, to give lateral stability to the rib. Ordinary rail anchors were later substituted for lagging clip angles to eliminate welding on the high-carbon rail.

The setting of the steel ribs differed only slightly from the wood ribs. Due to their 34-foot 6-inch length, their bent shape, and the angles welded to their outsides, delivery from the unloading yard to the point of use was difficult and at the time of our visit to the project, when they were being dragged in by a small tractor, an entirely satisfactory method had not been agreed upon.

Raised into position by a  $\frac{1}{2}$ -inch cable from the air hoist on the top deck of the jumbo, with one hitch around the rib at the point where the curve started and a second loop of the same cable 4 to 6 feet up the curve, each half-rib section required a good deal of handling

to get it into approximate final position with one end resting on the 9 x 12-inch block 2 feet long used for its support and the other curved and arched over the jumbo to connect it with the half-section set from the opposite side. Any warping of the rails made the placing and connection doubly difficult.

After they were in approximate position and had been bolted together at the crown of the arch, the ribs were leveled and sighted by the same methods used for the wood ribs and wedged and blocked to exact line and grade. Then the fourteen tie bolts, seven on each side, with their accompanying collar braces, 4 x 6-inch struts between adjacent ribs parallel to the tunnel center line, were set and tightened while other members of the crew placed the 4 x 6-inch lagging between the rib just set and the preceding one.

The time required for each operation varied somewhat with the depth of round handled by each blast and the spacing of ribs and amount of lagging required, but a typical cycle for a 14-

foot round at the east face was about as follows:

Drilling, loading, and shooting	6 hours
Mucking (including fuse clearance and moving time)	11 hours
Timbering or steel ribs	5 hours

Operations were continuous, except for the period from midnight Saturday night to midnight Sunday night when all driving operations were suspended. The progress at the east face was as follows:

February	54 feet
March	171 feet
April	258 feet
May	323 feet
June	295 feet
July	314 feet
August	326 feet
September	307 feet
October 1-13	159 feet

### Tunneling at West End

In the west end of the tunnel, seamy, shattered, unstable rock made the operations more difficult. Rock conditions were too dangerous to permit a full face to be carried forward in one operation and required an entirely different procedure from the east face.

(Continued on next page)

The world-wide reputation

Briggs & Stratton has earned as manufacturers of

"the world's finest gasoline engines" was born of

constant research in our plant and afield —

constantly adding refinements — developing

advancements in design, engineering

and precision manufacture.

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GASOLINE ENGINES

Always striving for and building for the best in air-cooled power — quick starting, dependable and economical — insuring trouble-free performance — has resulted in a demand for more than two million Briggs & Stratton engines — during 25 years of continuous production. BRIGGS & STRATTON CORP., Milwaukee 1, Wis., U.S.A.

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Get Stronger, Denser Concrete Rapidly and Easily with Less Material and Labor

WYCO Flexible Shaft Drive Vibrators eliminate honey-combing, air bubbles and scaly surfaces. Stronger, denser, high quality concrete is obtained with large savings in material and labor. WYCO machines have a national reputation for high efficiency and low maintenance cost. Both Electric and Gasoline Power driven units are available as illustrated, with interchangeable tools for Grinding, Drilling, Surfacing, Wire Brushing, Sawing, etc.

Write for Catalog

**WYCO Gasoline Power Vibrators** are mounted on Wheelbarrow or Stationary Swivel Base. Use standard air cooled engines and have ball-bearing jack shaft with twin V-belts. Equipped with WYCO Patented Jack Shaft Clutch—manually operated—completely disengages engine, prolonging life of shaft core—makes starting quick and easy.

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- 1 Nose of hard alloy steel.
- 2 Head completely sealed against grease, dirt or water.
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- 4 Two Normal Hoffman Roller Bearings and one Ball Thrust Bearing for dependable rotor action under most severe conditions.
- 5 Improved design for more effective rotor impulse to vibrator.
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Many WYCO Flexible Shaft Vibrators are the WYCO Patented Type. Models 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.



# Railroad Tunnel

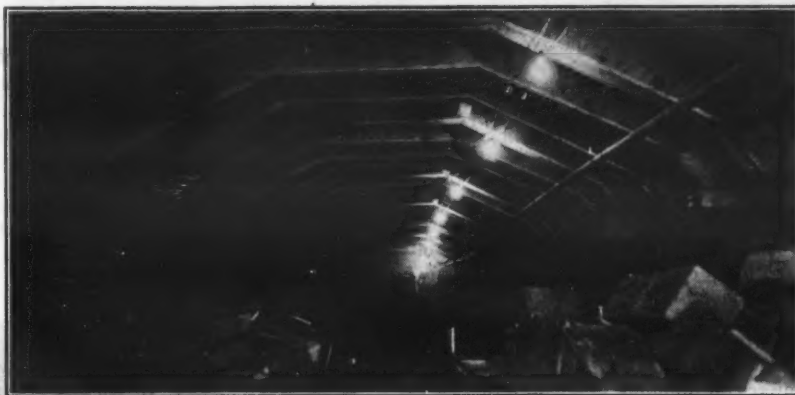
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The first phase was the driving of a top-center drift 7 feet wide and 11 feet high with its top sufficiently above the roof grade to permit the placing of permanent timbering below the temporary timbering and with its vertical center line coincident with that of the main tunnel. This top-center drift was taken out in 6 to 10-foot rounds, using four cut holes with instantaneous caps; two No. 1 delays in the holes on each side of the cut block; four No. 2 delays above and below it; two No. 3's at mid-height on the side lines; eight No. 4's in semicircles above and below; and four No. 5's to kick in the corners; making a total of 24 holes per round.

Rock from the top-center drift, which served as an exploratory pioneer tunnel as well as permitting advance timbering of the roof, was loaded by a Sullivan 1/2-cubic-yard mucker, hauled back to the jumbo in mine cars and dumped down the chute at the back of the jumbo into waiting trucks for haul to the west waste area 1,800 feet from the portal. A 1.5-kw LeRoi generator furnished power for illuminating the dump at night.

Temporary timbering of 10 x 10-inch posts and caps of the same size with 4 x 10-inch lagging was set in the top-center drift as soon as mucking was complete, and another round was drilled, loaded, shot and mucked. This drift was kept from 60 to 80 feet in advance of the shooting and mucking of the wall-plate heading, which was a semicircular area forming the top of the tunnel section and consisting of sections shaped like a slice of pie on each side of the top-center drift.

Vertical pipe posts, wedged at the top and bottom, supported Ingersoll-Rand column drills used for drilling holes parallel to the center line of the tunnel into the vertical faces at each side of the top-center drift which, in blasting, replaced the cut-hole block and furnished an opening into which the rock was blown by the explosion. The holes at mid-height of the drift and closest to its sides were loaded with instantaneous caps. No. 1 delay caps were used above and below these holes farther from the sides of the drift; No. 2 and No. 3 delays above, below, and outside



The wall-plate heading in the west end of the Northern Pacific Railway tunnel under construction near Bozeman, Mont.

of these holes; and finally No. 4 delays to cut out the corner of the top circle and horizontal floor of the wall-plate heading. Both sectors of the semicircle, one each side of the top-center drift, were blasted simultaneously and the material was loaded by the same mucker

used in the drift and was hauled to the dump in the same manner.

Permanent timbering of the roof was then done by placing 12 x 12-inch wall plates, blocked accurately to line, and grade on the floor of the wall-plate heading, in proper position to be supported

by the 12 x 12-inch plumb posts which would be set under them later after the removal of the rectangular section of rock between the top heading and the floor of the tunnel. Crossing the tunnel roof at right angles and with their ends resting on the wall plates, the timber arches made of five segments of 12 x 12-inch timber were placed, spaced between the vertical 10 x 10-inch posts of the temporary timbering and below the roof lagging which was supported by the permanent roof arches after the removal of the temporary 10 x 10-inch posts and caps.

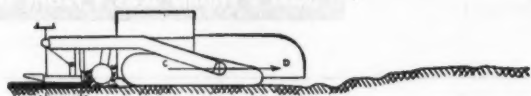
## Removing Lower Bench

When the top-center drift had been driven about 220 feet, the wall-plate heading driven about 140 feet and its permanent timbering properly set, operations were started on the remaining bench of rock. This was approximately 22 feet wide, 18 feet high in the center, and 21 feet high at the sides. Working from a jumbo identical with the one

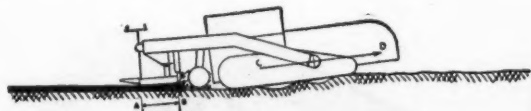
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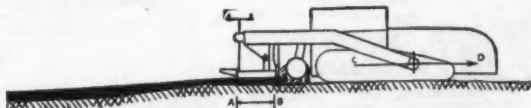
## HOW A B-G FINISHER LEVELS OVER THE BUMPS



With the screed adjusted for a given thickness, its under-surface, "AB," is kept parallel with the line "CD" by means of a long leveling arm.



As the crawler moves to a higher point, the screed bottom, "AB," is automatically tilted up, seeking to remain parallel with the line of pull, "CD."



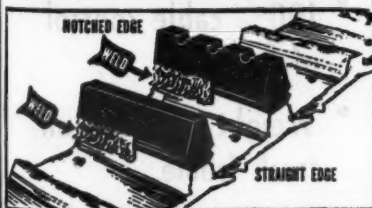
The screed will then climb upward until the line "AB" is again completely parallel to the line "CD." Thus, the mix is tamped into the depression, leaving a smooth, gently-rising surface.

• Dangerously cracked and broken pavements are restored to a safe surface . . . traffic-trampled highways are transformed into smooth-riding roads with the aid of the leveling device on a Barber-Greene Tamping-Leveling Asphalt Finisher.

Two pivoted arms connect the tractor and screed units. These long arms account for the delayed action of the screed when the machine is climbing or descending to any new level. A rise or fall of several inches in the tractor unit is reflected only slightly on the screed plate, preventing sharp depressions or bumps in the final surface.

As the crawlers change level, the level of the screed is automatically, but gradually, altered—for it constantly seeks to keep in line with the direction of pull. And, helping to make the finished surface smoother still are the long tractor crawlers that bridge a large number of the depressions. Consequently, many changes in the level of the screed plate are avoided. For complete details on the leveling principle of the B-G Finisher write for Catalog 879. Barber-Greene Company, Aurora, Illinois.

Rebuild your  
**TRACTOR GROUSERS**  
WITH **BULLDOG**  
*Grip-Lugs*



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CLEVELAND 14, OHIO

**Barber-Greene** **B-G** *Constant Flow Equipment*





## RR Tunnel in Rock 3,015 Feet in Length

(Continued from preceding page)

used in the east end, three crews each consisting of a foreman, four miners, four helpers, four laborers, one nipper, one shovel operator, one oiler, and the necessary number of truck drivers, worked this face.

A total of 60 to 65 holes were drilled, with center-cut inclined holes to make the initial opening and surrounding holes loaded with progressive delay caps up to a No. 15 delay. The top 5 feet of rock in this section was not drilled or loaded, in order to protect the permanent roof timbering in place above it in the wall-plate heading, but was permitted to drop of its own weight into the cavity made below it by the blast.

The depth of the rounds was determined by the tie joints in the wall plates since it was necessary so to arrange the shots that each pair of wall plates supporting the permanent timbering could have one end supported by a plumb post in the completed tunnel section and their other ends supported by undisturbed rock forming the floor of the wall-plate heading.

When each round of bench had been mucked out by an Austin Badger 1/2-cubic-yard electric shovel and the rock hauled to the dump by diesel-powered trucks, the plumb posts were set and wedged into position to support the wall plates above them while the wall plates in turn supported the roof timbering.

Although this procedure, necessitated by the less stable rock encountered in the west end of the tunnel, was slower than the operations conducted in the east portal it did permit more efficient use of available man-power, as drilling and timbering could be done in the top-center drift and wall-plate heading while mucking of the heavier volume of rock from the bench was under way. In addition to permitting full use of the west portal crews, it furnished an opportunity to use part of the crew from the east portal while mucking in their end prevented their effective use there. Progress from the west end, in feet per month, was as follows:

Month	Top-Center Drift	Wall-Plate Heading	Bench	Full Face
April	27	...	...	...
May	85	52	...	...
June	149	132	40	...
July	48	101	162	...
August	...	65	148	...
Sept.	82	10	...	86
Oct. 1-15	...	40	17	...

At 350 feet underground, full-face tunnel operations were commenced at this heading.

### Major Items of the Contract

The major items of the contract were as follows:

Clearing and grubbing	9 acres
Roadway excavation, common	125,100 cu. yds.
Roadway excavation, solid rock	233,700 cu. yds.
Drainage excavation, common	1,200 cu. yds.
Drainage excavation, solid rock	400 cu. yds.
Structural excavation, common	600 cu. yds.
Structural excavation, solid rock	120 cu. yds.
Tunnel excavation, unclassified	2,850 lin. ft.
Additional excavation for enlargement	1,160 cu. yds.
Placing permanent timber lining in tunnel	200 MFBM
Drain pipe in tunnel, installed	4,000 lin. ft.
Weld joints in pipe	840 joints
Sealing seams in rock face of tunnel	4,000 lin. ft.
Concrete in tunnel lining	13,900 cu. yds.
Concrete in portals	1,660 cu. yds.
Concrete in surface drain ditch	300 cu. yds.
Placing reinforcing steel	112,000 lbs.
Grout rock seams	4,000 per sack-cement
Installing electric conduit, pipe and fittings	13,500 lbs.

### Personnel

The contract for this railroad tunnel near Bozeman, Mont., was awarded December 12, 1943, by the Northern Pacific Railway under the direction of Bernard Blum, Chief Engineer, to the J. C. Boespflug Construction Co., of Seattle, Wash., and holing through took place in November, 1944. Placing of the concrete lining is now in progress. For the contractor, R. A. Riedesel is Job Manager, A. Aitken is General Su-

perintendent, and Leonard Bury is Night Superintendent. For the Northern Pacific Railway, D. H. Shoemaker, formerly a Division Engineer, is in charge at the site of the job, assisted by Resident Engineer W. G. Ashworth. Instrument work is in charge of L. W. Brown.

### Power Chain Saws

Among the features claimed for Chain Lightning electric or air-driven chain saws made by the Lombard Governor Corp., Ashland, Mass., are the ease and speed with which the chain links can be replaced, fast cutting action, minimum power consumption, long chain life, ease of sharpening, and no chain clogging or binding.

The air-driven model is equipped with a standard 3 1/2-hp vane-type motor requiring 100 cubic feet of air at 90-pounds pressure, obtained from a compressor; weighs approximately 42 pounds with a 24-inch cutting chain, and is especially recommended for underwater cutting. The electric-driven model is powered by a 3-hp 220-volt ac 3-phase 60-cycle electric motor developing 3,600 rpm, with 8 feet of heavy insulated cable, and with gear transmission. Its weight is 78 pounds with a 24-inch cutting chain, and 85 pounds with a 36-inch cutting chain. All models are furnished with safety bars.

The chain links have a patented permanently welded hook form of construction, providing an interlocking chain. Chain links may be quickly replaced in the field without the use of tools, as the links are manually assembled or disassembled in about two minutes' time, simply by hooking and unhooking. Chain flexing is accomplished by a hinge pin riveted between the two side members of the links at the front end of each link, permitting the use of a large pin and providing longer chain life.

The fast cutting action of the saw results from a narrow kerf and from the arrangement of the series of four teeth. Because of the narrower kerf, resulting from a narrower chain, minimum power is required. Thin cutting edges are used, and the cutting surface is so designed as to minimize the effort required to sharpen them.

Further details on Chain Lightning power chain saws, with sectional views of both the air and electric-driven types, are contained in Catalog S-400, copies of which are yours for the asking. Address your inquiry to the manufacturer.

### A Unit to Strike Off And Compact Concrete

A new 6-page folder on the Master vibratory finishing screed has recently been issued by Master Vibrator Co., 100 Davis Ave., Dayton 1, Ohio. The folder contains complete details, with illustrations, on the use of this vibratory finishing screed in highway work, on airport aprons, runways and hangar floors, ware-

house floors, dock decks, street paving and sidewalks, bridge decks and canal inverts. Models are available in adjustable widths up to 26 feet and case histories show that this screed will strike off and compact over 6,000 square feet of concrete per hour.

Copies of Form 596, which is also available in Spanish for Central and South American readers, may be secured by writing direct to the manufacturer.



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YOUR TRACTOR RIMS  
BECAUSE THE TEETH ARE  
WORN DOWN TOO FAR**

Just lay out a new PACIFIC Manganese Steel Renewable Rim over the old sprocket. Torch off the spokes—weld the PACIFIC Renewable Rim on the sound spokes and hub . . .

And you have a rim with tough, long-lasting manganese steel teeth, which has cost very little and will deliver a LOT of service. Both PACIFIC Sprocket Rims and Idler Rims are carried in stock for immediate shipment.

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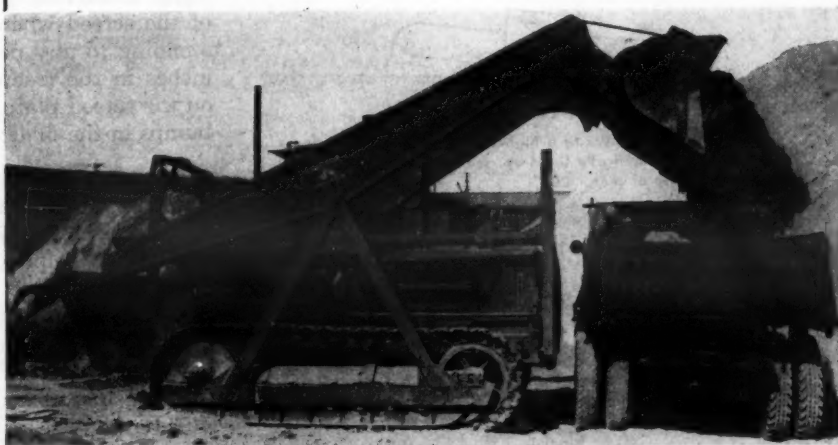
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SPROCKET AND IDLER RIMS

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## McCAFFREY TRACTOR SHOVEL



- 1 1/2-yard capacity bucket.
- 100% cable control of bucket.
- Weight centered on truck frame.
- Design permits bucket to reach over center of the truck.

For sizes and  
specifications  
of this unit  
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## Today's Steel Output Tops Pre-War Needs

The peak tonnages of steel which went into construction projects, automobiles, home appliances, farm equipment, machinery, containers, and other basic products of American industry in any year of the pre-war period add up to only about two-thirds as much steel as was produced in 1944, according to the American Iron and Steel Institute. All told, about 37,256,000 tons of finished steel would have been consumed if the peak production years for each of such basic products had occurred simultane-

ously. The largest pre-war annual consumption of steel for construction was in 1929, when 8,643,000 tons of steel was used.

For 1944, it is estimated that total shipments of finished steel from steel plants to all consumers exceeded 62,000,000 tons.

### Euclids on the Job

Tough off-the-road hauling jobs, involving the transportation of earth, rock and heavy excavation under a variety of conditions, are illustrated in a new 24-page stiff-covered book issued by The

Euclid Road Machinery Co., Chardon Road, Cleveland 17, Ohio. Rear-Dump Euclids, which are described as possessing unusual strength and durability, are shown at work on jobs all over the country, where the ability to withstand the pounding of rock and heavy excavation, as well as the power and speed for long steep climbs, was of prime importance. The center-page spread illustrates the versatility of Euclids working under various conditions of terrain and climate.

Interested users of heavy hauling equipment may secure copies of "Production with Rear-Dump Euclids" by

writing direct to the manufacturer and mentioning this review.

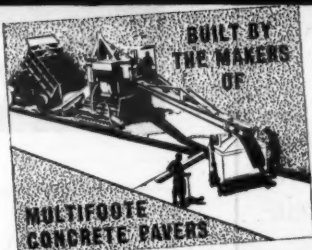
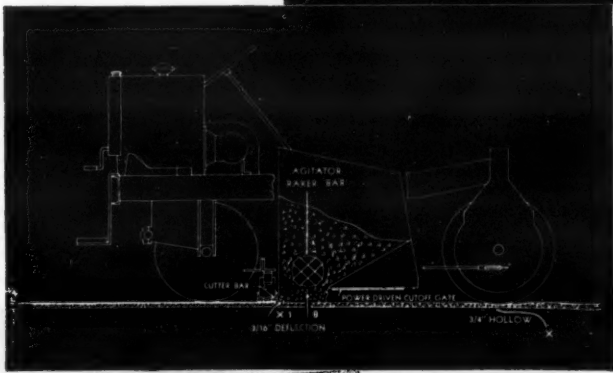
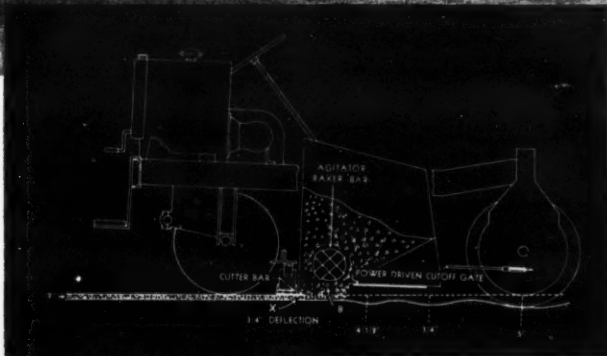
### U. S. Rubber Names Eastern Sales Manager

The promotion of James E. Power to the position of Eastern Sales Manager of the Mechanical Goods Division has been announced by the U. S. Rubber Co., New York City. Mr. Power was made Manager of the New York branch of that division in 1926, and was later named Assistant Manager of branch sales. His career in the rubber industry dates from 1906.



The first course showing front wheel dropped into deep depression.

The top course showing how Continuous Course Correction has reduced hole 5" deep to 3/16".



**ADNUN**  
TRADE MARK REGISTERED  
**BLACK TOP PAVER**

With Continuous  
Course Correction

# How

TO RESURFACE  
OLD ROADWAYS

with less subgrade preparation

Use the black top paver that automatically reduces the irregularities of the surface with each successive course laid! That's what Continuous Course Correction does in Adnun Black Top Pavers.

The Adnun rides on the finished course close to the cutter bar and well back from the front of the machine. The front wheels can drop into quite a deep depression without materially affecting the leveling action of the cutter bar. For example, a 5-inch drop of the front wheels will leave only a 3/4" depression at the point where the cutter bar is at that time. When the top course is laid, the resulting deflection is reduced to 3/16". Deep holes large enough to permit the wheel to drop the full depth are extreme cases. Generally subgrade irregularities are reduced to insignificance when the top course is laid.

You can lay any mix—hot or cold—any thickness—any width—with an Adnun. You'll be sure of maximum density for your black top paving, tight joints between strips, smoothest finished surface, and all-weather durability. Write today for details or see your Foote distributor.

**THE FOOTE CO., INC.**  
**NUNDA, N. Y.**

The World's Largest Exclusive Manufacturers  
of Concrete and Black Top Pavers.



## Handy Decals Mark Fire Extinguishers

Fires can be fought more quickly and effectively with the proper type of extinguisher designed for the particular kind of blaze. However, in fire emergencies, people often do not know which extinguisher available is most suitable. Three handy decalcomanias have been made up for use on first-aid fire extinguishers by Walter Kidde & Co., Inc., 140 Cedar St., New York 6, N. Y., manufacturer of fire-protection equipment, to provide the desired information. These decals indicate clearly the kind of fire for which each unit is suitable and the kinds of fire on which it should not be used. They are easily applied to any type of extinguisher.

Correct marking of extinguishers will direct the untrained or excited employee on the spot, preventing loss of time during the all-important first moments after the outbreak of fire, and help to avoid misuse of equipment. A limited number of the decal sets will be supplied free.



Three handy decals to mark fire extinguishers with "when to use and when not to use" information.

and larger quantities may be had for a nominal charge by writing direct to the company and referring to this illustrated item.

### Post-War Roads for Egypt

Highways connecting the main towns in the Nile Delta with North Africa as far west as Casablanca will be provided

by the post-war road construction program planned for Egypt, according to a recent item in *Highway Highlights*. One important link will be a road from Alexandria to El-Arish on the Egypt-Palestine border. Another will connect Dessuk, on the western branch of the Nile with Sherbin, a distance of 175 miles. The project will cost £15,000,000, it is reported.

### New Curing Solution

A clear solution for membrane curing, known as Plasticote, has been developed by Presstite Engineering Co., 3900 Chouteau Ave., St. Louis 10, Mo., for application as a single spray coat immediately on completion of the finishing of a concrete road surface or as soon as free water has disappeared from the surface. The film adheres to the concrete surface without chemical reaction and it dries to a hard glossy surface in approximately 30 minutes. It is designed to seal the concrete and provide for the retention of not less than 90 per cent of

the original mixing water within the concrete. Application is usually at the rate of about 1 gallon per 200 square feet, and almost any type of spray gun may be used.

Complete information regarding this membrane curing solution may be secured direct from the manufacturer by mentioning CONTRACTORS AND ENGINEERS MONTHLY.



**DURABLE  
STREAMLINED  
ECONOMICAL**

• Users everywhere are realizing the many profitable advantages of the Johnson Clamshell Bucket, the bucket that combines clean, fast digging with full protection against wear.

All-welded construction eliminates rivets, bolts, and other impeding projections, assuring best balance and better digging quality in all kinds of material.

Renewable lip edge-bar of tough manganese steel combats wear and is easily replaceable in the field.

Needle-bearing mounted closing sheaves permit free-running cable action at all times, bearings are sealed against entrance of dirt and moisture.

Lower sheaves are fully protected by heavy rugged steel plates. All sheaves have large diameter for increased cable life.

General purpose type, 1/2 to 1-1/2 yards capacity in stock for immediate delivery.



Johnson Bucket in open position showing heavy shock-preventing protection plate for lower sheave assembly.



Johnson Clamshell Bucket showing manganese steel teeth designed for smooth speedy digging.

Write today for full information.

**The C. S. Johnson  
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BUY UNITED STATES  
WAR BONDS AND STAMPS

# HERCULES HYDRAULIC BOOSTER HOISTS MAKE ANY TRUCK A DUMP TRUCK



Install HERCULES Double-Arm Hydraulic Hoists under your platform, stake, express or special bodies, and unload the easy way! Use your present equipment with maximum efficiency.



Here's Model KXE HERCULES BOOSTER HOIST, with 6 inch cylinder, for bodies up to 12 feet long. This model has a rated capacity of 4 tons with a 9 foot body, and other models for both lighter and heavier loads are also available.

Control valve is operated from driver's seat, and the low oil pressure required insures long life of unit. Reinforcing plate relieves lifting strains, and assembly includes 12 foot steel sills for reinforcement.

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GALION, OHIO



# Black-Top Surface For Old Brick Road

**Leveling, Binder and Top Plant-Mix Courses Give New Life to Highway Near Springfield, Illinois**

NEEDED improvements were recently made to sections of the highway encircling the eastern half of Springfield, Ill., under a \$99,800 contract awarded by the Illinois Division of Highways to the D. D. Lain Co. of Springfield. The 5.4-mile job included laying bituminous plant-mix on portions of the City Belt Line, U. S. 54 and By-Pass 66, south and east of the city; a section of Clear Lake Avenue from the city line east to its intersection with the City Belt Line; and a 3,800-foot stretch on Sangamon Avenue just outside the northeast city limits and also connecting with the City Belt Line by-pass. An old concrete pavement 18 feet in width, which was widened to 22 feet, and a brick section 20 feet wide furnished a base for the black top in the first two parts of the contract, while the section on Sangamon Avenue, which was completed last and is described in this article, was originally an 18-foot 20-year-old brick road laid on a lean-concrete base. Under this contract, the Clear Lake Avenue section was widened 2 feet on each side with a strip of 9-inch uniform-thickness concrete. Work was started in June and finished by October, 1944.

## Sangamon Avenue Section

The first step in the Sangamon Avenue improvement was to clean the old brick pavement with a power broom and to shave off any thick bituminous patches with a power grader, as too great a concentration of asphalt at these spots might cause bleeding and shoving in the new surface. An Etnyre 1,000-gallon pressure distributor mounted on a Diamond T truck then applied a prime coat of 0.07 to 0.10 gallon of emulsified asphalt, EA-1, per square yard for half the width of the road. A full distributor primed 1.9 mile of half-width pavement. This section was closed to traffic for a day to permit curing and was usually covered with the new pavement within two or three days.

On the rather uneven brick surface, a Barber-Greene Tamping-Leveling-Finisher laid a bituminous leveling course consisting of practically the same gradation and proportion as the top or surface course but in a thin layer from 1/4 to 3/4 inch thick and averaging 75 pounds to the square yard. This leveling course, covering the entire road surface, smoothed out the minor irregularities in the old pavement. A binder course was next laid, with no time intervening, at the rate of 162 pounds to the square yard and was compacted to 1 1/2-inch thickness. This was followed by a surface course of similar weight and thickness but differing in the gradation and proportion of materials. All courses were compacted by two rollers, a 10-ton 3-wheel Huber and a 10-ton tandem Buffalo-Springfield. Water for wetting the treads of the finisher and the rollers was transported from city hydrants in a 1,000-gallon tank mounted on a Chevrolet truck.

The finisher laid an average of 600 tons in an 8 1/2-hour day, during which eleven men were employed in the road crew, not counting the drivers of the contractor's trucks. The men were distributed as follows: a foreman, a paver operator, 2 roller operators, a driver of the water tank truck, 2 men on the pressure distributor, 2 rakers in back of the finisher, and 2 laborers for dumping trucks and for miscellaneous duties.

The road was finished off with 3-foot crushed-stone shoulders, 3 inches thick

at the pavement and tapering to 1 inch at the slope line. The stone was graded from 3/4 inch down to fines to obtain good compaction.

## Asphalt Plant

The hot-mix plant was located at the center of the job and the material was hauled a mile from there in eight White trucks with a capacity of 7 1/2 tons, or the equivalent of five 1 1/2-ton batches. The Cedarapids portable asphalt plant, with a 1 1/2-ton batch capacity, was set up on a siding of the Illinois Terminal Railroad just off Clear Lake Avenue at the center of the job. The stone was freighted from the National Stone Co. 150 miles to the north in Joliet, Ill., while the coarse sand was purchased from the Lincoln Sand & Gravel Co. 25

miles away and was also brought to the plant by railroad. The stone dust and the fine sand for the top or surface course were transported by rail from the Consumers Co. in Chicago, 175 miles distant. The asphalt came both in tank cars and in a 7,000-gallon trailer-truck combination from the Pioneer Asphalt Co. in Lawrenceville, 140 miles south-east of Springfield. The asphalt was loaded at the plant in Lawrenceville at

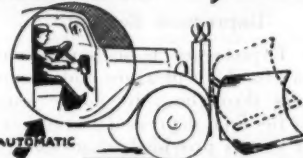
a temperature of 470 degrees F and was delivered at never less than 360 degrees F in Springfield.

The contractor's plant had two 8,000-gallon tanks for storing bituminous material and a 6,000-gallon tank for fuel oil. A LeRoi-powered pump was used for unloading the asphalt at the plant and delivering it to the weigh bucket at the pugmill. A Northwest crane with a

(Concluded on page 89)

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## Detroit Expressway Is Opened to Traffic

(Continued from page 41)

width of right-of-way is 314 feet with more added at grade separations. Most of this land was acquired without too much difficulty by direct negotiation and purchase. Condemnation proceedings had to be resorted to only in a few isolated cases.

The Expressway cuts through a considerable area of land owned by the Ford interests. This acreage, which represents about 3½ miles of right-of-way length and was valued at \$1,600,000, was donated to the State by Mr. and Mrs. Henry Ford, the Ford Foundation, and the Ford Motor Co.

Along Section 3 closest to the metropolitan area the costs naturally were highest; land acquisition for the 2-mile section from Ford's River Rouge plant in Dearborn east to the city line, for instance, cost \$750,000. Land which was ideal for industrial sites was expensive for road location. Most of this land was taken in large parcels, the smallest being 6 acres. One 20-acre parcel was bought from the Chrysler Motor Co. for \$80,000, the assessed valuation. The total cost of right-of-way for the 34-mile Expressway was \$3,266,000, which cost was borne by the State.

### Built Like a Railroad

The Expressway with its long tangents, easy gradients with a maximum of 2.5 per cent except on ramps where 3.5 per cent is permitted, and long-radius curves is built like a railroad and designed for high-speed driving. With the widely separated two lanes in each direction, head-on collisions are impossible and, with plenty of driving space provided for, other accidents should be at a minimum. The 24-foot concrete pavement is 9 inches uniform thickness with no reinforcing. Twelve-foot stabilized shoulders of 6-inch earth and limestone rock border the pavement. From the shoulders in the fill sections the roadway meets the original ground surface in a 1 on 6 slope. The area between the pavements drains to the center point where a longitudinal ditch was constructed to carry surface water to cross-drainage outlets.

In the western sections the Expressway is practically all built on embank-

ments. These fill sections consist of cores of sand from 4 to 8 feet in thickness. Bridges and interchange structures were met at a straight grade, a departure from the usual design procedure where grade crossings usually entail a dip in the main highway.

From Greenfield Road easterly for the last 2½ miles to Detroit, the Expressway is all in cut. Because of the many bridges encountered in this area, which would demand huge embankment fills, and the scarcity of good fill material as well as the low bearing value of the underlying soil, it was decided to build this final lap of the road in a depressed section. Less right-of-way was needed, which was no small factor in this high-priced industrial zone.

### Depressed Section

The Expressway is a limited-access highway for both pleasure and commercial cars throughout its entire length, and for the final depressed section no access or exit is provided whatsoever, except at the grade separation for the Ford

River Rouge plant immediately east of the Greenfield Road bridge. This complicated-appearing, but in reality very simple, system of approach structures will be the main avenue of entrance to the Ford plant at Gate 10. Further east the Expressway passes under Schaeffer Highway which carries a double line of trolley tracks and which has been the main artery of travel from Detroit to the River Rouge works. Traffic had to be

maintained on Schaeffer Highway while the bridge was under construction. An embankment sufficiently wide to carry a dual-lane temporary road with trolley tracks in between was built. When the Schaeffer bridge was completed, this temporary fill was dug out and used as sub-base material on the depressed section.

East of Schaeffer a tunnel was con-

(Continued on next page)

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# Some Details of Work On New Detroit Route

(Continued from preceding page)

structed to carry electric conduits and steam pipes under the Expressway from the Ford plant to the Ford administration offices which lie on the north side of the Expressway. The pavement is laid directly on top of this tunnel. A little farther east another tunnel was necessary where the Expressway passes under Rotunda Drive bridge which leads to the Ford Rotunda to the north. This tunnel carries the water and sewage pipes from the city of Dearborn in an ingenious siphon arrangement.

The next bridge is the heavy overhead crossing of the main line of the New York Central 8-track system. Beyond that, in close succession, the Expressway passes under Miller Road, the Detroit Terminal Railroad, the Pere Marquette Railway, and finally Michigan Avenue to the end of the present construction at Wyoming Road. Railroad traffic naturally had to be maintained; consequently the tracks of both the New York Central and the Pere Marquette systems were carried on embankments adjacent to the bridges under construction while work was under way.

## Drainage

In the embankment or fill sections side ditches were for the most part unnecessary. The sand core beneath the pavement furnishes good drainage and the longitudinal ditch between the two roadway sections prevents water from accumulating in the open grassy areas. The depressed section, however, provided some interesting problems. An elaborate system of side ditch drains and laterals empties into trunk sewers which run underneath the center of the roadway. During the construction of the bridges a 6-inch pump was kept going 24 hours a day at each location to carry away the water which was brought to these low spots by the trunk sewers. Three pump houses were constructed in the depressed section with three 14-inch automatic pumps each, and ground or storm water is pumped into the city sewerage system or into the Rouge River.

## Pavement

The numerous paving contractors who were awarded contracts followed standard modern methods of laying concrete. The Oak Construction Co. of Detroit, for instance, had a \$132,437 contract to pave the Expressway from the bridge that leads in to Gate 10 at Ford's to a point opposite the Ford administration building, a distance of 4,500 feet. A Koehring 27-E paver was used in laying



Paving on the Taylor Bros. contract on the Detroit Expressway. The Ransome paver is followed by a Lakewood finisher and a Flex-Plane joint machine.

the full 24-foot width of 9-inch-thick plain-concrete pavement. A two-screed Jaeger-Lakewood finishing machine was followed by a Koehring Longitudinal

Finisher. Transverse expansion joints were spaced at 120 feet while contraction joints, 2½ inches deep, were set at 20-foot intervals. The premoulded expan-

sion joints were set ½ inch below the surface and were later filled with asphalt. Membrane curing was used, the Aquastatic compound being sprayed from an air-pressure tank located on a rolling bridge.

## Major Quantities

Some idea of the magnitude of this Expressway project may be gained by a glance at some of the major quantities in the contracts:

Item	Amount
Clearing	220 acres
Removing trees (8 to 37 inches and up)	1,500
Removing old pavement	161,986 sq. yds.
Earth excavation	7,983,624 cu. yds.
Reinforced-concrete pipe,	
12 to 48 inches	10,273 lin. ft.
Plain-concrete pipe, 12 to 72 inches	31,079 lin. ft.
Vitrified sewer pipe, mostly 6-inch	361,436 lin. ft.
Plain-concrete sewer pipe,	
12 to 34 inches	136,433 lin. ft.
Manholes	295
Catch basins and drop inlets	1,194
Porous backfill	54,509 cu. yds.
Concrete pavement, 6, 7, 8.5, and 10-inch	253,101 sq. yds.
Concrete pavement, 9-inch	1,283,569 sq. yds.
Concrete base	1,867 sq. yds.
Concrete curb, varied types	284,082 lin. ft.
Topsoil surface	151,207 cu. yds.
Stone masonry	3,503 cu. yds.
Sodding	546,927 sq. yds.

(Concluded on next page)

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## Detroit Expressway Outstanding Project

(Continued from preceding page)

These items and many others too numerous to list made up the construction of the roadways of the Expressway for a total cost of \$11,658,852. To this must be added the cost of the fifty-one bridges on the Expressway which include the two tri-level separations at the Willow Run Bomber Plant and seven railroad grade separations. The other structures are road interchanges. Twelve pump houses are considered as part of the bridges which they service. The cost of these fifty-one bridges by sections was as follows:

Section 1 (Willow Run)	\$ 1,737,000
Section 2	2,518,000
Section 3	6,590,000
Total	\$10,845,000

The total cost of the Detroit Industrial Expressway is then:

Right-of-way land acquisition	\$ 3,266,000
Roadway and paving	11,658,852
Bridges	10,845,000
Grand total	\$25,769,852

### For the Future

At the end of Section 1 on the Expressway a connection was designed and built, in the vicinity of Hannan Road, for a possible tie-in with any future express highway that may be built to Chicago, Ill. Something more proximate, however, is the extension of the Detroit Industrial Expressway to the east from the city line so that it will continue on through the city of Detroit. This badly needed cross-town route will follow generally McGraw, Stanley and Harper Streets to the very northeast corner of Detroit at the vicinity of Eight Mile Road. This route will be known as the Detroit Crosstown Expressway.

Another essential feeder to this route is the proposed John C. Lodge Highway which will connect the Expressway with

the very heart of downtown Detroit. This route will begin at West Jefferson, near Second, and extend northerly, following the general alignment of Sixth and Hamilton to the vicinity of Longfellow where it will turn northwest to connect with the James Couzens Highway. Both roads will be high-speed limited-access routes, partly depressed, partly elevated, and partly at street level, and will be capable of handling large traffic volumes speedily.

On the Detroit Industrial Expressway outside the city limits the cost of construction was divided between the State, which paid 25 per cent, and the Federal government which paid the remaining 75 per cent. The State bought the right-of-way and paid for all engineering. With regard to the proposed expressways in the city of Detroit, the State will pay 50 per cent of construction costs, the City 25 per cent, and Wayne County Road Commission the remaining 25 per cent. Federal funds will be available on a matching basis. Plans are being prepared so that work can start within 60 days after road-construction restrictions are relaxed and Federal funds are made available.

This article will be followed in subsequent issues by a description of slope stabilization to prevent slides in the depressed section, and an article on the construction of a 156-foot skew span to carry the New York Central main-line tracks over the Expressway.

Charles M. Ziegler is State Highway Commissioner of Michigan.

### Dump Hoists and Bodies Described in Bulletins

A complete line of dumping equipment, including a compact hydraulic hoist designed to fit any truck 84 inches cab-to-axle dimension and which raises the truck platform only 2 3/4 inches; twin-cylinder hydraulic hoists for heavy-duty dumping service; and a wide variety of dump bodies embodying special Heil design features and accessories, is described in literature available from The

Heil Co., 3000 W. Montana St., Milwaukee 1, Wis. These folders cover the construction of the equipment, its suitability for particular jobs, and include complete specifications. The numerous illustrations show assembled units, individual pieces of equipment, and depict typical installations with component parts clear-

ly indicated. This equipment covers a wide range of sizes from 1 1/2 to 21-cubic-yard capacity.

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- \* Scientifically designed to prevent snagging—on hatches, cornices, etc., a fault in ordinary hooks;
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Privates William J. Shoemaker and Vinton W. Dove, bulldozer operators in a U. S. Engineers Combat Battalion, received Distinguished Service Crosses for gallantry in action on D-Day. Both had jobs with contracting firms before entering the service.

### Bulldozer Operators Receive DSC Awards

Privates William J. Shoemaker and Vinton W. Dove, members of an Engineer Combat Battalion, working in shifts with their bulldozer while it was a specific target for intense mortar and cannon fire, dragged capsized wheeled and track-propelled vehicles out of the surf on D-Day in Normandy. Then, with the battle raging furiously about them, they set out in their unprotected machine to clear obstructions from the beach exits. This dangerous objective accomplished, they smashed road blocks and filled in gaping anti-tank traps while geysers of earth from bursting shells rained down on their Caterpillar D7 equipped with a Le Tourneau bulldozer. In the words of the official citations, "Their courageous actions permit-

ted vehicles and armor to move out in support of the infantry troops."

Privates Shoemaker and Dove received the second highest decoration awarded by the Army from Lieutenant General John C. H. Lee, Commanding General, Communications Zone, ETO, while the entire brigade, standing at attention, looked on.

Before entering the Army, Pvt. Shoemaker was employed by the Harrison Construction Co., of Pittsburgh, Pa., and Pvt. Dove was a construction foreman for the C. M. & H. Construction Co., Washington, D. C.

### Blaw-Knox Appointment

The appointment of Paul M. Mueller, widely known mechanical engineer, as Chief Engineer in Charge of Development for Blaw-Knox Co., Pittsburgh,

Pa., has recently been announced. Mr. Mueller is an Iowa State College alumnus and worked for the Nebraska Power Co. in Omaha prior to World War I. After experimental work for the air service in 1917 and 1918, he joined Pratt & Whitney in 1919. Most recently Mr. Mueller was Headquarters Engineer for the Revere Copper & Brass Co.

### Diesel Engines and Plants

A new 20-page catalog describing the Witte line of diesel engines and Dieselectric power plants has recently been issued by the Witte Engine Works Division, Oil Well Supply Co., 1600 Oakland St., Kansas City 3, Mo. Following an introduction on the features and economy of diesel power, the booklet covers the various models of both vertical and horizontal Witte diesel engines in 4, 6, 9 and 12 hp and similar sizes of Dieselectric plants for a variety of on-the-job power service.

Copies of this Catalog No. 10 may be secured direct from the manufacturer.

### Scotland Had First Road Maintenance Tax

Scotland had a road maintenance tax some 400 years ago, we read in the September-October, 1944, issue of *California Highways and Public Works*.

In the early sixteenth century, the Canongate was one of the first paved streets in Edinburgh. It was also the main street of the medieval Scottish capital. Soon after the paving of the Canongate was finished, James V of Scotland in 1535 issued a proclamation governing all traffic on the Canongate. The law applied equally to private and government-owned vehicles.

Empty carts and wagons using the Canongate were compelled to pay a tax of one halfpenny every time they traveled along the street. Loaded carts and other vehicles paid a tax of one penny to "repair and maintain the causeway".

This proclamation of the Stuart King was certainly the first to levy taxes in proportion to the amount of wear and tear on a street or highway.

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The new Clyde Model C car puller.

### Improved Capstan-Type Car Puller Described

For fast and economical car moving, the new Model C Clyde capstan-type car puller is reported to give greater efficiency with less horsepower. In a 4-page catalog just received, this small, compact, sturdy and self-contained unit is described in detail and complete specifications are given, together with recommendations to aid in selecting a car puller for various weights and under different conditions.

Copies of this descriptive bulletin may be secured by writing directly to the Clyde Iron Works, Inc., Duluth 1, Minn., and mentioning CONTRACTORS AND ENGINEERS MONTHLY.

### Current Construction In Dominican Republic

A number of new surfaced highways which will open up regions previously inaccessible to truck transportation are now under construction in the Dominican Republic, according to a recent issue of *Foreign Commerce Weekly*. The land-water highway route built under contract by the Dominican Public Works lacks only 62 kilometers (about 39 miles) of surfacing work to complete the repair of the Dominican link to the Haitian border.

Private building construction, principally concentrated in the capital city, has also been active. It has been estimated by the Director General of Public Works of the Dominican Republic that the volume of construction will at least be doubled as soon as adequate supplies of building materials are available at peacetime prices.

### Goodrich Belt Has Long Service Record

Almost 14 years of unbroken service in driving a generator in a crushing plant, operating nine hours daily, six days a week, seven months in the year, is the record reported by The B. F. Goodrich Co., Akron, Ohio, for a Goodrich belt. The generator runs the first primary crusher in the stone quarry pit, two incline conveyors out of the pit, and all of the screens in the plant, and during its period of service the rubber belt has traveled an estimated distance of 1,200,000 miles.

Made endless on the job when installed in March, 1931, this 105-foot-long belt has not changed position since it started operations, although it has had to be run tight. It is treated occasionally with belt dressing. The drive speed is 4,600 fpm or 52 miles an hour. The prime mover is a Skinner Uniflow 850-hp engine, on which the shaft pulley is approximately 11 feet, driving to a 34-inch pulley on the generator shaft at 514 rpm.

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### CLARK PORTABLE LIGHT PLANT

Use it when other light sources fail.

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Use it also to power small tools—electric drills, sanders, etc.

The CLARK PORTABLE LIGHT PLANT can be taken quickly to any location and supply immediately 500 watts of electricity. No batteries to recharge—no acids to spill.

And—it throws a beam so powerful that it is possible to read a newspaper a block away!

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245 E. Keefe Ave., Milwaukee 12, Wis.

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WRITE FOR CIRCULAR

# Times are different NOW...



## BUT YOU CAN STILL BANK ON PURPLE STRAND QUALITY

Remember when scenes like this excited no comment? When bridge construction was an everyday activity? When newer and taller skyscrapers nosed their way upward?

Those were the days when war was only an ugly word, and your Purple Strand rope was devoted entirely to peacetime uses. You put it to work lifting girders, plates, I-beams. If the job required rope that was not only strong and durable but also highly flexible, you asked for Purple Strand Form-Set. You knew that Form-Set, Bethlehem's preformed rope, would

spool easily, handle well, and laugh at bending fatigue. You knew, in short, that it was a healthy, long-lived rope and therefore economical.

Today that vitality is even more important, for every foot of wire rope is precious. So, when you plan to reeve those boom, hoist, or bucket lines, keep asking for Purple Strand Form-Set. Perhaps the work you're doing isn't the same as it was in the prewar days, but it's probably just as tough, and that's the best reason for having a top-quality rope on your payroll.

Purple Strand Form-Set is the

finest grade of wire rope we offer. You can depend on it now, just as you could before the war. And that's a promise for future days, too.



When you think WIRE ROPE

... think BETHLEHEM



### PROTECT WITH Fultex TARPAULINS WIND BREAKS

Fultex waterproof covers give economical protection—one of the most widely used, serviceable covers on the market. Recommended for heavy duty and long wear at low cost.

Quick delivery from stock on standard size covers.

FULTON BAG & COTTON MILLS

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# Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

## Let the Seller Beware

Here is a "364 question": What is the most important rule of law, peculiarly applicable to public contracts, that should be well-known and well-remembered by every public contractor?

Offhand, our answer would be: The rule which requires contractors to take notice of the fact that a contract let in disregard of an ordinance or statute requiring competitive bidding is void. A more comprehensive answer would be: The rule of law which requires every one dealing with a public officer or public board to take notice of limitations on his or its power to bind the public body on whose behalf a contract is made.

In passing, it is interesting to note the possible consequences of performing a contract that has been invalidated for lack of competitive bidding. No doubt, there are cases where the contractor has been denied right to collect anything. But what seems to be the prevailing view of the courts is indicated in the decision rendered by the Louisiana Supreme Court in the case of Boxwell v. Department of Highways, 14 So. 2d, 627, involving a sale of construction materials to the State Highway Commission at a price exceeding \$500, which called for competitive bidding. Because there was no such bidding, the sellers were permitted to recover only the actual cost of the materials without any profit to them. The court said:

"Equity would favor, we think, the placing of the parties in the positions that they occupied prior to the carrying out of their engagements, or in other words in status quo; but, of course, this is impossible because of the materials having been used. The only alternative is to compel payment by the vendee, or its successor, of an amount that represents the materials' actual cost to the vendor, without allowing any profits on or expenses connected with the sales."

"An enforced settlement of this kind not only does justice and equity between the parties, but also it provides the protection to the taxpayers that the statute under consideration contemplates. At the same time it is notice to contractors and furnishers of materials that their dealings in the future with public agencies must be conducted in accordance with the law's provisions; otherwise the anticipated profits and attendant expenses will be denied them and their efforts will go for naught."

"If it were possible to restore in kind the merchandise furnished by the vendor, the ordering or restoration would undoubtedly be proper. Most of the courts throughout the United States sanction such a settlement."

## Wages on Public Jobs

That a worker's receipt for wages in full will not necessarily prevent him from coming back and asking for and getting more is shown by the decision of the Texas Court of Civil Appeals in the case of Austin Bridge Co. v. Teague, 149 S. W. 2d, 674.

A Texas public works contract was governed by a statute requiring that the contractor pay prevailing wage rates. Teague worked on the job and was paid off as an unskilled laborer and signed a receipt for his wages on that basis. But he later successfully sued to collect the difference between what he received and the higher wages to which he was entitled as a

skilled laborer. The contract listed his work as skilled labor.

The court incidentally decided: That the statute provided punishment by fine, etc., for its violation did not exclude the employee's right to sue for the deficiency in wages paid him. That employees are not direct parties to construction contracts does not prevent enforcement of provisions made for their benefit. Teague's signing of releases of his wage claim was not supported by any legal consideration and therefore was not binding upon him.

## Roadside Barricade Enough

A Kentucky highway contractor placed steel forms, weighing about 160 pounds each, end to end along the edge of a road to protect a newly constructed concrete slab about 500 feet long. Warning signs and bomb torches indicated the presence of the forms, one of which in some unknown manner got into the

traveled lane of the highway, causing an accident to a passing automobile.

Acquitting the contractor of liability for the accident, the Kentucky Court of Appeals upheld judgement in his favor, in an action for damages brought by occupants of the car. (Barnes v. F. C. Gorrell & Sons, 177 S. W. 2d, 395.) The Court approved the following statement of rules of law governing cases of this kind:

"Ordinary care is all that is required, and no liability will be incurred, ordinarily, for injury resulting from the subsequent removal

or impairment of such safeguards without the fault or knowledge of the person or corporation so charged with the duty of maintenance, unless there was reason to apprehend or anticipate such removal or impairment, or unless there was negligence in failing to replace or restore such safeguard after notice of its removal or impairment."

Yet, the court fully recognized that "one may be liable for injuries to a traveler who stumbles over a barrier which falls or is knocked down because of the negligent manner in which it was constructed."

## FASTER • SAFER • CLEANER SNOW REMOVAL

with DAVENPORT-FRINK SNO-PLOWS



You can meet every snow condition with engineer preferred Sno-Plovs. Available in V-Blade and Straight Blade types for trucks, tractors and motor patrols, with or without leveling wings, with hand or power hydraulic operation.

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VALVE troubles result in excessive consumption of lubricating oil, rough running and stalling engines, hard starting. As a rule, most of these valve troubles are caused by mechanical difficulties, although some result from slow speed operation, permitting excessive deposits.

### CHIEF CAUSES OF VALVE FAILURE

1. **Insufficient Tappet Clearance**... Correction lies in more frequent tappet inspection and accurate clearance adjustment.
2. **Valve Face or Seat off Center**... This trouble may result in heavy gum and coke deposits piling up on under side of valve head and forcing it off seat. Here correction lies in proper valve grinding, or replacement.
3. **Warped Valves**... Valves that are warped will apparently hang open at high speeds while clearing at idle. Re-seating or replacement is only correction. Reducing abnormal temperatures will likely prevent repetition.
4. **Weak Springs**... Replace with springs meeting manufacturer's specifications for spring tension.
5. **Worn Valve Guides**... Guides become worn from dirt in air intake or oil resulting in coke or gum deposits that build up on valve stems because of excessive oil. This may be corrected by more frequent service of air cleaner or installing more efficient air cleaner; and replacement of worn guides.
6. **Deposits on Valve Seat**... This is the most frequent cause of leaky valves with consequent loss in power and fuel efficiency. Source of this trouble is usually heavy carbon or lead deposits in combustion chamber, very rarely from foreign matter within combustion chamber. Narrower valve seats and strong springs with more accurate grinding technique are remedies.
7. **High Temperature Exhaust**... Caused either by back pressure due to restricted exhaust system or poor carburetion or late timing. This condition results in warped valves and assists in building up varnish, lacquer, gum or deposits on valve stems, resulting in sticky and/or leaky valves. Cure is to clean out or replace muffler and tail pipe and improve combustion.
8. **Insufficient Cooling**... Caused by scale, rust or muddy deposits in water jackets; failure of water pump to deliver enough water; bad vanes in pump; slipping pump

belt. In all cases cleansing or repairing of cooling system is called for.

### MAIN CAUSES OF STICKY INTAKE VALVES

Intake valves rarely fail or burn because they are constantly cooled by incoming charge of air-fuel mixture. However, they do frequently stick, due to:

1. **Gum Content of Fuel too High**... Gum in fuel forms deposits around valve stem above guide and under valve head. To correct, change to fuel of proper specification.
2. **Worn Guides and Stems**... Since most of stem and guide wear is due to dirt and dust in air, remedy is more frequent service of air cleaner, or installation of larger capacity oil bath cleaner and, of course, replacement of worn guides and valves.

### RING-FREE MOTOR OIL HELPS REDUCE VALVE TROUBLE

Correction of valve trouble is obviously a mechanic's problem. However, motor oil that penetrates fast—gets down around valve stems, and guides—reduces friction, and thereby prolongs life of valve. Macmillan Ring-Free Motor Oil has this quality of fast penetration. Furthermore, it is refined to withstand high engine temperatures. Ring-Free acts as a preventive for valve sticking, saving fuel consumption and costly repair bills.

### FREE BOOKLET

Write today for copy of free pamphlet on "Sticky and Burned Valves—Causes and Preventions." Address—Macmillan Petroleum Corporation, Room 1012, 530 W. 6th Street, Los Angeles 14, Calif.



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RING-FREE  
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## Sign-Making a Function Of Shops at Hamburg

(Continued from page 30)

and a 60-ton hydraulic arbor press used to remove gears, shafts, etc. Here also are the oil and kerosene drums. Delvac oil is used for lubrication.

In the northeast corner a section 13 feet wide x 60 feet long is used as a stock room for small parts for trucks and other equipment. To the south of the stock room is the lavatory. South of this is the office of the Motor Equipment Maintenance Supervisor, C. Naber, adjacent to which is a first-aid room. In the southeast corner of the building is the machine shop, 20 feet wide x 80 feet long. Here are found a Kwik-Way valve grinder, a Sunnen hone for fitting piston pins, a No. 2 Langelier 1/4-inch bench drill press, a Weidenhoff under-cutter for armatures, and a Cincinnati electric tool grinder. Complete with a cabinet 5 feet long x 3 feet wide x 3 1/2 feet high, for storing reels of metal wire, is a Mogul Metallizer used for building up shafts, bushings, castings, spraying zinc on truck bodies, etc.

Other machine-shop equipment includes a 10-inch-diameter No. 3 Universal grinder, a 14-inch x 4-foot Prentice lathe, a 1/2-inch drill press, a 15-inch x 6-foot American lathe, a No. 2 Maximill machine for milling keyways, a 24-inch-stroke American shaper for shaping and planing metal, a 2-inch American radial drill, and a Racine power hack saw.

### Signs Made and Reconditioned

Nearly all highway signs for the state system are reconditioned at this Hamburg shop in western New York and nearly all standard signs, except route markers and some other embossed signs, are manufactured here. Signs for reconditioning are crated and shipped in by freight from the other districts; signs from the local district, around Buffalo, come in on trucks. They are received at the metal-working shop building, which is the center structure of the three-building unit. This shop is built of wood with wooden roof trusses, an asphalt-shingle roof, and concrete floors.

Here the signs are taken apart and the reflector buttons removed. They are then sent to the main repair shop, at



Assembling reflector-button signs in the sign shop of the N. Y. D. P. W. District 5 shops at Hamburg, N. Y.

the rear or north end of which two lean-tos have been erected. In one of these is a 6-foot-long x 3-foot-wide x 3-foot-high paint-stripping vat in which the signs are hung on racks. Here the paint

is removed in about half an hour by means of an Oakite solution kept at the boiling point. Heat for this vat and three other tanks in the sign shop is furnished by an Ames 25-hp high-pres-

sure boiler which is located in the adjoining lean-to and is fired by soft coal.

The signs then go back to the metal-working shop which occupies the southern half of the middle building. The signs are straightened by pounding with hand hammers on a steel table 6 feet long x 3 feet wide x 1 inch thick. The smoothed-out signs are next given a treatment called "bonderizing". Twenty to thirty signs are hung on a rack which is supported on an overhead track by a block and tackle. The signs are dipped first for 5 minutes into a tank containing a solution which deposits a crystalline phosphate coating on the steel plates to improve the adherence of enamel to the zinc-coated sheets. The next bath is a rinse and is followed by a bath of chromic acid to re-acidify and to rust-inhibit the metal. These vats are each 6 feet long x 2 1/2 feet wide x 6 feet deep.

Along the west side of this room is a 6-foot-long Pexto pan brake which bends the steel reflector-button pans used in

(Continued on next page)

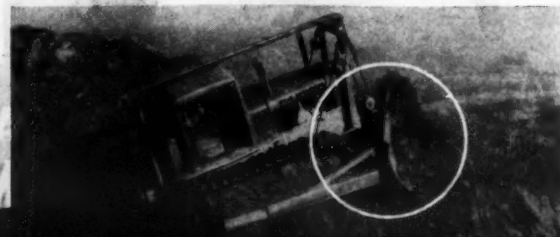
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A newcomer to the civilian field . . . thoroughly tested by months and months of strenuous military service. Designed by Gar Wood engineers and found to meet all Army and Navy requirements, this rugged Doze caster embodies new and improved engineering developments that give you more efficient performance. Note the moldboard built closer to the radiator for better balance. Easier pushing too, because it

actually rolls the dirt ahead of it. (See picture below) Moldboard can be angled to either side and tilted. Comes with the famous Gar Wood CABLE CONTROL UNIT, either single or double drum. Now available in limited quantities for essential civilian use. Consult your nearest Allis-Chalmers dealer for assistance in obtaining a War Production Board Release.



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Up to 1000 Tons per day

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50 Years' Experience

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## Hamburg Shops

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backing the signs. Holes for reflector buttons are punched in the signs with a 3/4-inch-stroke Buffalo Forge punch press. A 42-inch-blade Pexto power shears cut the metal material to the size required for the signs. This room is also used for raw material storage of the No. 16 gage plates which come in 12-foot lengths of 24, 30, and 36-inch widths. At present the material used for signs is Armco Zinc-Grip plate. These plates are coated with pure zinc by a special hot process which provides a tight protective zinc coat.

### Painting the Signs

After bonderizing, the signs are ready for painting. The paint shop, the last or northernmost building in line, is a wooden structure with 11-foot-inside vertical clearance. The walls are lined with plaster board and heat is supplied through steam pipes located around the walls. The heating system is similar to that employed in the adjacent metal-working shop and both buildings are heated by a marine boiler, formerly used by a tugboat on the Erie Canal, located in a lean-to built on the south end of the paint shop.

In the southwest corner of the paint shop is a 6-foot-long x 8-foot-high x 7-foot-deep DeVilbiss spray booth which has a water screen air-washing unit in the rear. Water is pumped from the tank in the bottom by a Fairbanks-Morse 1/2-inch centrifugal pump to the nozzles at the top and then falls in a sheet to the bottom of the booth. The paint particles in the air currents pass through the spray, and a chemical added to the water precipitates the paint so that the carrying of particles to the outside is prevented.

Each sign is given two coats of synthetic baking enamel with DeVilbiss spray guns, each coat being baked in a gas-fired oven for 1 1/2 hours at 225 degrees F. This temperature is about the same as that used in the oven of an ordinary cook stove. The oven is 12 feet long x 7 1/2 feet high x 7 1/2 feet deep and is equipped with explosive-proof doors.

After the signs have been given the proper background coatings, the symbol or message on the face of the sign is placed by a rolling process if the sign is embossed or raised, or by the silk-screen stencil process if the sign is flat. In the rolling process the paint is put on a metal plate and a double-handed 4-inch-diameter 18-inch-wide rubber roller is run over the plate and then over the raised portion of the sign. These embossed route markers and stop signs are made by convicts at the Auburn state prison.

### Silk-Screen Process

The designer first lays the sign out on paper. He then lays a thin film over the paper and cuts out each letter. This Profilm is laid on a fine mesh silk screen stretched on a wooden frame and wet with a solvent which softens the film so that it enters into and becomes a part of the silk, making it impervious except where the letters or pattern have been cut out. The wooden-framed screen is hinged to a flat-top table and the sign to be lettered is placed under the screen. A thick processing paint, about the consistency of paste, is forced through the open meshes of the silk with a rubber blade or squeegee. Normally, one or two passes of the squeegee across the screen is sufficient to letter a sign, and the time consumed is a matter of seconds up to three-quarters of a minute, depending upon the size of the sign. A large sign, which takes two or three hours to letter by hand, can be lettered with the silk stencil in less than a minute.

The signs now advance to the north-west corner of the paint shop where the reflector buttons are put in by hand and the protective pans are bolted on the back. Non-reflectorized signs, that is plain-faced signs, are usually completed without backs or bracing, as the 16-gage metal used is strong enough for most signs without backing or embossing. Buttons are used two or three times in the cycle of repairs to a sign.

These reflector buttons are tested to see whether they are suitable for replacement by a Photovolt apparatus developed by Eastman Kodak Co. which works on the principle of the photo-electric cell. Readings on a galvanometer represent the reflective power of the buttons directly, and are established for acceptable buttons. Those failing to reach the minimum are discarded.

This section of the shop also contains paint storage and the crating department. In the southeast corner is the sign design room. The entire room is well lighted by twenty 200-watt bulbs.

(Concluded on next page)

## LITTLE RED DEVIL

Light and Power for the Contractor

### Superior Features

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Model DC 508,  
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COAL LOADERS • STRIPPING SHOVELS • GAS • DIESEL • ELECTRIC (From 3/4 cu. yd. to 35 cu. yds.)



## Hamburg Shops

(Continued from preceding page)

Prior to the war, up to 25 men were employed on sign work and the cost of the work ran to about \$75,000 a year. If the old hand methods of reconditioning had been employed, and new signs bought in the open market, the cost would have been at least \$135,000 per year, which indicates a savings to the state of about \$60,000. The Hamburg shop made 5,000 flat signs a year and reconditioned 20,000 others. Preparations are now under way to resume work on this scale when conditions permit.

Signs are tested for exposure and rust to the metal plate, enamel paint, and buttons in a yard outside of the shop. Some of these signs have been there for eight years, or since the shop began operations in 1936. Some signs are still in good condition while others have failed. The test racks show that practically all of the steel panels without zinc coatings have failed. Signs now manufactured or reconditioned have a life expectancy of about five or six years.

### Other Shops

The sign metal-working room is entered through a 12 x 12-foot sliding door in the south wall of the middle building. A similar door in the north end of the room leads into the other half of the building, in the southwest corner of which is located the carpenter shop. Here crates are made for shipping the signs back to their destination. Equipment used includes a woodworker, a combination 12-inch rip saw and 6-inch jointer, a 10-inch-blade cut-off saw, and working off a counter-shaft belt driven by a 5-hp electric motor are a 24-inch grinder and a 1/2-inch drill press. A 12 x 3 x 3-foot-high carpenter's work bench rounds out the equipment.

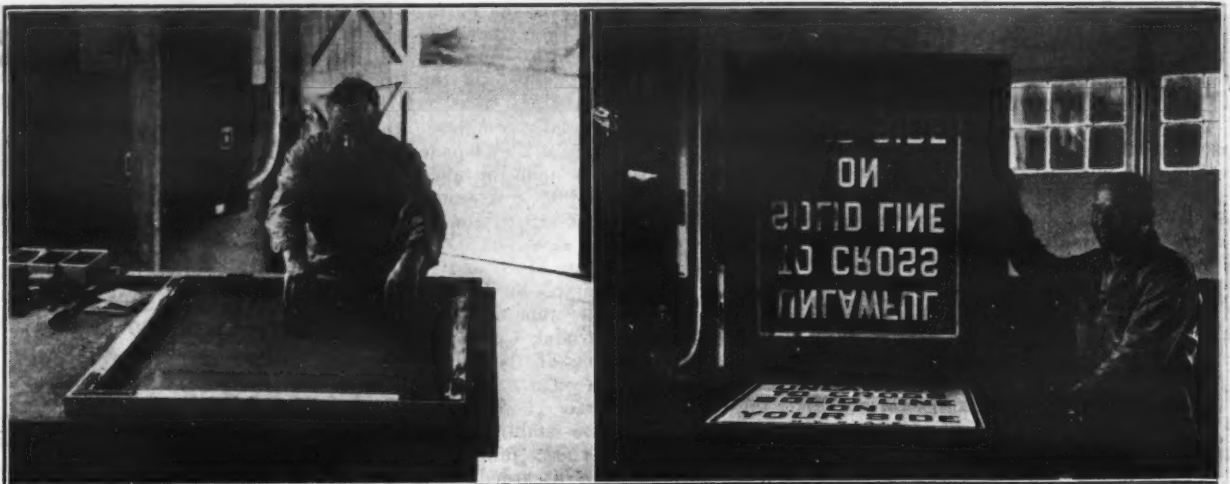
In the northwest corner is the blacksmith shop which contains a 3 x 6-foot x 1-inch-thick steel table; a 115-pound anvil; a 3 x 4-foot electric-driven forge; and two heavy-duty bench vises mounted on a 12 x 3 x 3-foot bench. Across the room in the northeast corner is the welding shop which contains an Oxyweld portable acetylene outfit and a 200-ampere Westinghouse electric welder driven by a 4-cylinder Continental gas engine. The rest of the room is given over to storage of the steel for signs and other uses.

### Equipment Maintained

Equipment maintained at the garage includes 75 trucks of all makes and capacities, 7 compressors, 13 conveyor loaders, 2 core drills, 4 convertible shovels, 4 bituminous distributors, 6 traffic-stripe machines, 45 concrete mixers, 1 bituminous paver, 1 mower, 14 power graders, 4 pumps, 20 rollers, 1 sander, 1 sweeper, 20 tractors, 2 portable welders, and 21 tractor-mowers.

### Personnel

The administration of the Hamburg shops of District 5, New York State Department of Public Works, is directed by Charles R. Waters, District Engineer, I. T. Storm, Assistant District Engineer,



Lettering a highway sign by the silk screen process. Left, inking a sign through the silk stencil; right, the screen raised to show the completed sign stencilled by the silk screen process.

and E. G. H. Youngmann, assistant to the District Engineer. General supervision of the sign shop and investigation

of related equipment and materials are part of the duties of M. A. Bebee, Traffic Engineer. C. Naber is Motor Equip-

ment Maintenance Supervisor and in direct charge of the activities of the shops.

## Safety First . . Remove Ice Hazards

### THE NEW WILLETT HYDRAULIC TRUCK-GRADER

is now available for Highway Departments



"HUNDREDS IN USE BY THE U. S. AND ALLIED ARMIES AT HOME AND ABROAD, MAINTAINING AIRPORTS, APPROACH STRIPS, ROADS, STREETS, ETC., ALL YEAR 'ROUND."

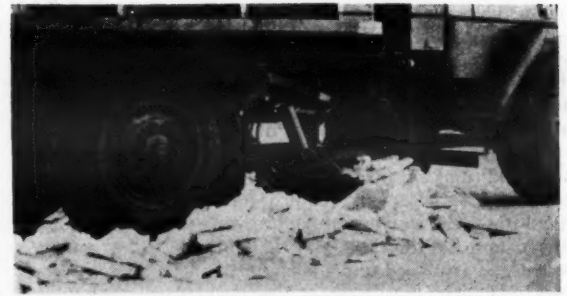
Cuts, breaks up ruts and ice off streets and roads quickest, cheapest way with rotatable curved moldboard, cushioned or rigid operation, blade pitched forward for ice cutting when desired;

—all with full hydraulic power control of tilting, rotating, and reversing of curved moldboard from the truck cab.

### IT CUTS!

### IT GRADES!

### IT MAINTAINS!



The above new "Willets" on state highway trucks are doing a splendid job cutting and breaking up ice and general all year around maintenance. Many city and county highway departments are using "Willets" with great success! Models for all makes of trucks, 1 1/2 tons and up; standard lengths up to 14'; moldboards up to 17" wide; 10" to 15" clearance under lifted blade.

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**COMPLETE**  
**WELL POINT SYSTEMS**  
**WILL DRY UP ANY**  
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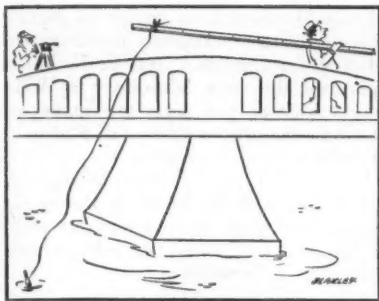
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### Inter-American Route Lacks Many Bridges

Several hundred new and replacement bridges still must be built along the Inter-American Highway stretching 3,356 miles between the Mexico-Texas border and the Canal Zone, according to the Public Roads Administration. The Highway is being constructed by the five Central American republics, Mexico, and Panama, with the assistance of the United States.

Major General Philip B. Fleming, Federal Works Administrator, who personally inspected the route this year, has stated that the Highway may be open for travel all the way from the United States to the Canal Zone by October, 1947. About three-fourths of the route is now open to all-weather travel and another 300 miles is passable in the dry season.

Three bridges of some size and a number of small bridges are urgently needed in southern El Salvador, but their erection is provided for in financing arrangements made by El Salvador and the United States. The three large bridges to be built are over the Rio Grande de San Miguel, the Rio Sirama, and the Rio Pasaquina. Edwin W. James, Chief of the Inter-American Regional Office, Public Roads Administration, who made the inspection trip with General Fleming, says that the Sirama bridge will, in all probability, have a 200-foot span. At the Pasaquina, a new continuous deck truss of 80, 128, and 30-foot spans is under construction. To avoid excessive gradients at the approaches, the piers will have to be about 40 feet high. At the Rio Grande de San Miguel, there is an old Spanish brick arch bridge which is off line and too light even for present traffic. It will be replaced by a new bridge, probably of 440-foot length.

The remaining bridge program in

Central America is considerable. In Nicaragua, 26 temporary bridges must be rebuilt during the next few years. In Costa Rica, some 49 bridges with spans of 50 feet or more must be constructed in the northern region and at least 30 more must be built in the southern part. In northern Costa Rica, bridge construction can be advanced independently ahead of road work in the dry season, as a construction road and water transportation provide access. In southern Costa Rica, however, little can be done unless highway work, for which appropriations are at present lacking, goes along with the bridge construction, as the section is isolated and there is no access except that furnished by the Highway.

An undetermined number of bridges are needed on the Mexican and Panamanian sections of the Highway. The Mexican section, whose exact route has not yet been fully determined, is being constructed by the Mexican Government's Highway Department, and Mexico is paying the entire cost of the highway and bridge construction. In Panama, the present route of the Carretera Central, designated as the general line of the Inter-American Highway, will be relocated, especially between David and Santiago. On this 144-mile section there are a number of bridges, including two suspension spans and a multiple-truss span. Whether or not these lie on the relocated line of the Highway, the bridges will probably have to be replaced as they are all single-lane structures.

Probably 100 or more bridges from 20 to 50 feet long will have to be built throughout Central America to replace temporary crossings now existing or to supply new crossings. Local masonry will be used as far as possible. Arches and concrete-steel combinations which give the greatest economy and best fit local conditions will be employed.

All bridges newly designed for the Inter-American Highway are for H-15 S-12 loading, in accordance with AASHO standards. As far as possible, designs are duplicated for economy and expedited production.

### Rotary Pump Features

Both hand and power-driven rotary pumps for handling all types of petroleum products including gasoline, kerosene, oil, and hot asphalt are made by Blackmer Pump Co., Grand Rapids 9,

Mich. In a new 8-page Bulletin 102, Blackmer describes the design and operating features of the power-driven pump with numerous illustrations and diagrams, and on the last page illustrates and describes its rotary hand pumps. Copies of Bulletin 102 on power-driven

pumps and No. 205 on 1½ to 25-gpm rotary hand pumps will be sent by the manufacturer promptly to those mentioning CONTRACTORS AND ENGINEERS MONTHLY.

Speed up Victory by buying War Bonds!

## K PERKIN'S LIQUID CHEMICAL KLEENZALL

No. 10

Liquid Chemical for Steam-Cleaning Machines of All Makes

### DIRECTIONS

For ordinary grease and dirt, cut *KleenzAll* No. 10 15 to 1 with water.

For heavy duty work such as road machinery or the inside of motors, or for repainting surfaces, cut 10 to 1 with water.

If water used contains more than 5 grain hardness, it should be treated with our *KleenzAll* No. 15 water softener, using one pound to 50 gallons of water. Let stand 30 minutes, then fill your tank with this treated water. This ratio of *KleenzAll* No. 10 : : *KleenzAll* No. 15 breaks down the iron, lime and calcium in hard water.

**Guarantee:** This product is guaranteed to be free of soap, rosin or oils of any kind. Therefore it is impossible to create fatty acids which would accelerate clogging up of coils. \$500 will be paid to any one proving that the manufacturer uses any of the above ingredients in this product.

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**H. L. PERKINS CHEMICAL COMPANY**

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Greater Compactness, Increased Capacity and Efficiency

### H & B Portable (PA-30) Asphalt Plant...

☆ This popular portable asphalt plant has been made even more compact and efficient by several refinements in design. A larger fan and a new horizontal cyclone dust collector are used, and the dust system from the dryer to the dust collector and from the dust collector to the exhaustor has been redesigned. The exhaust fan, motor which drives the dryer, and the speed reducer are combined in one completely assembled unit which is mounted on a separate platform. This decreases the length of the dryer unit, and greatly facilitates handling. A new type of screen reduces the overall height of the plant—without reducing the bin capacity.

Complete information on this more efficient portable plant will be furnished on request.



**FLUIDOMETER**  
Automatic Metering System—saves time, materials, insures accuracy and uniformity. For all types of asphalt.

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Stop in and see us!

**E. D. ETNYRE & CO., Oregon, Illinois**



## Virginia Clay Base Stabilized by Chemical

(Continued from page 43)

pneumatic-tire roller was used for final rolling.

When the base had dried to about 60 per cent optimum moisture, one-half of the project, for the full width of the road, was primed with 0.3 gallon of RT-4 per square yard, and was followed by a light covering of sand. The tar was allowed to cure for a few days, then another 0.3 gallon of RT-4 was applied, 40 pounds of No. 12 stone chips were placed on the surface, and rolled by a smooth-wheel roller.

Although Hercules Powder Co., producer of Stabinol, does not recommend using a Stabinol-treated base without its first being surfaced, the Virginia Department of Highways intends to experiment with unsurfaced roads to determine the qualities of stabilized bases under extreme conditions.

### Proportions to Use

The amount of Stabinol required for various kinds of soils is determined by a laboratory examination of the soil, but a 15-minute crater test in the field will tell if the soil has possibilities of uniting with the chemical powder. A small amount of Stabinol and soil are dry-mixed in proportions of 1 to 100 and then shaped into a crater into which water is poured. If the water fails to penetrate the surface of the Stabinol-mixed soil, satisfactory results may be expected. Stabinol waterproofs the soil by preventing the penetration of surface water or the capillary rise of moisture from below, thus maintaining adequate bearing strength.

As Stabinol must be thoroughly mixed with the soil, it is apparent that satisfactory results may not be possible when a very heavy clay which defies mixing is encountered. By the same reasoning, since Stabinol reacts chemically with soils, a soil that has been previously treated with road oil will be so covered with particles of bituminous material that a chemical union is impossible. Best results have been obtained when this chemical was used for lightly traveled roads or in parking lots where heavy abrasive or skidding action is absent, or as a base on main highways with hard-wearing surfaces. Its use does not abolish the necessity of providing an adequate sub-base and drainage. Possibilities for the use of Stabinol are also seen in irrigation canals, earth dams, levees, playgrounds, waterproofed adobe blocks, and on steep embankments to prevent erosion.

Because it prevents water from percolating through a treated soil, the chemical is not recommended for race tracks, baseball fields, tennis courts, etc., where loose uncompacted soil is necessary for a top course. In such instances, waterproofing is not desirable as treated soils would act like a tin roof from which water could not run off nor be swept off, but would remain in any impressions made in the surface. Stabinol is not used to dry up a muddy road as it has no water-absorbent qualities.

### Widely Used

Stabinol is being used by the U. S. Army both in this country and overseas. The U. S. Army Corps of Engineers is also testing the material in special installations, and several state highway departments are also using Stabinol. Ohio has built a 3,000-foot stretch of stabilized road, and Pennsylvania and Maryland have projects under way. It is also used at the Naval Ammunition Depot in Hastings, Nebr., and by the Civil Aeronautics Authority in Philadelphia, Atlanta, Ga., and Vandalia, Ill.

Equipment manufacturers are now working on road-mixing machines which



Rotary mixing of soil and stabilizer on the Farmville, Va., project.

will be sufficiently diversified so that they can apply and mix into the soil Stabinol or any other kind of stabilizer highway engineers may decide to use.

### Personnel

For the Virginia Department of High-

ways, of which C. S. Mullen is Chief Engineer, the Farmville project was under the direction of Shreve Clark, Testing Engineer, K. G. McWane, Division Engineer, and W. W. Nichols, Resident Engineer. W. H. Burnside was Field Engineer for the Hercules Powder Co.

Evart Mayfield is in charge of Naval Stores sales to the highway construction industry for Hercules, and C. F. Moss supervises the soils laboratory at Wilmington where soil tests are made to determine the proper amount of Stabinol needed for specific projects.

A special force of Hercules-trained men is available to assist in the engineering field work and to cooperate with the project engineers on jobs where Stabinol is to be used.

### Davey Names Omaha Dealer

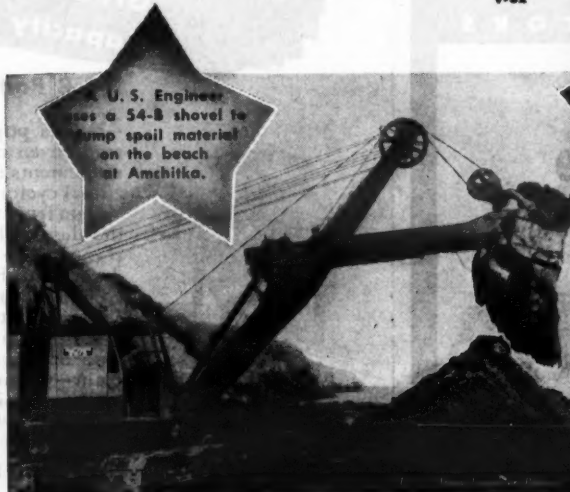
The Cliff Miller Machinery Co., 215 No. Twelfth St., Omaha, Nebr., has been appointed a franchise dealer by the Davey Compressor Co., Kent, Ohio, maker of a line of portable and stationary compressors, heavy-duty truck power take-offs, and pneumatic saws. The new distributor will handle a complete line of Davey compressors and spare parts in its Omaha location, and will also maintain a branch office in Sioux City, Iowa.

## UNSUNG STARS OF A FIGHTING TEAM

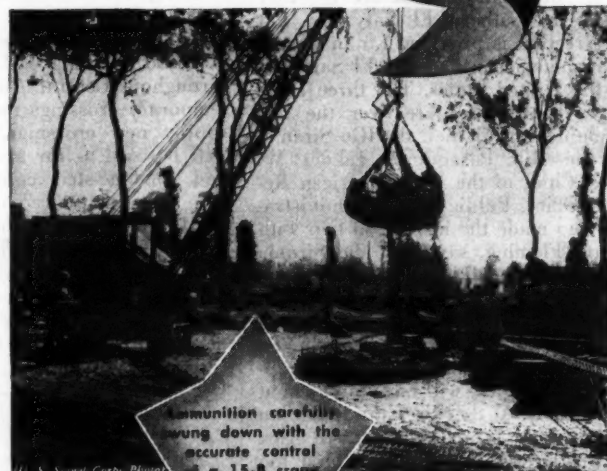
**M**EN who know their jobs and do them with outstanding effectiveness — this description fits not only our incomparable fighting men but equally the men who operate excavating equipment on the fighting fronts. Skilled in excavation, they give to their brothers in combat the help they need to win more quickly, playing superbly their positions on an invincible fighting team.

Of them and of the significance they have given to excavators in war, Bucyrus-Erie is proud. It is proud, too, that so many of the machines at the fingertips of these skilled men are speedy, smoothly-performing Bucyrus-Eries—as always, leaders in their field.

v-22



A U. S. Engineer uses a 54-B shovel to dump spoil material on the beach at Amchitka.



Ammunition carefully swung down with the accurate control of a 15-B crane in France.



In England Engineers work with a 15-B pile driver.



Gravel loading hurried in France with a speedy 15-B shovel.

**BUCYRUS  
ERIE**

South Milwaukee, Wisconsin





British Combine Photo  
Despite Kipling's famous line, East and West here meet in the Allied effort to reconstruct and repair the Burma Road which, when joined with the new Leda Road, will make possible effective overland supply to China.

### Supercharging Means More Engine Power

The Supercharger, whose phenomenal performance on aircraft engines in World War II has skyrocketed it to fame, offers the simplest and the most effective means for increasing the power output of an internal-combustion engine without appreciably increasing its weight and overall dimensions. The Roots-type of positive displacement compressor is particularly well suited for engines operating at variable speeds because of its ability to deliver air very nearly in proportion to its speed. This characteristic of the positive displacement blower imparts the necessary lugging ability to an engine, which is so necessary in motor trucks, tractors, power graders, and other applications requiring high torques at low speeds.

To the truck operator, supercharging may mean greater payloads and lower cost per ton-mile. It gives the extra power necessary to climb steep grades with greater speed, thus shortening the time required for the run. Tractors powered with supercharged engines are able to do more work in a given day. Because of supercharging, power shovels can take larger bites and more of them every day.

By reason of its positive and forced displacement of air, even under heavy load, when the power curve is backing up against the torque curve, the supercharged engine can deliver more power and has greater lugging ability for the tough emergency loads, which in the final analysis determine the operating load of the unit. Load capacity goes up and operating costs per unit of work go down.

Complete information on the application of supercharging to the power units of construction equipment may be secured by writing to B-W Superchargers, Inc., 3420 W. Capitol Drive, Milwaukee 9, Wis., stating your problem.

### New Edition of Budd Dual-Wheel Catalog

Engineers, maintenance superintendents, truck owners and operators, and tire men will be interested in a 28-page catalog now available from the Budd Wheel Co., which contains information to aid in the selection of new equipment, servicing and replacement of old, and in changing over tire and wheel equipment. Complete details on Budd dual and single wheels, their construction and application under various conditions, are included, together with informative tire charts. Accessory parts are also described and illustrated, and a parts price list is given.

Copies of this catalog will be sent upon written request to the manufacturer at 12141 Charlevoix Ave., Detroit 14, Mich., and mention of this item.

### Plywood Concrete Forms

Concrete-form panels of quality-grade Douglas fir plywood, oiled and edge-sealed and reported to offer unusual qualities of strength and rigidity, are described and illustrated in a pamphlet received from the Douglas Fir Plywood Assn., Tacoma Bldg., Tacoma 2, Washington. In addition to describing Plyform panels, which, it is stated, are economical in labor and material and have high salvage value, the pamphlet contains a number of suggestions for preserving the forms to secure multiple re-use. For conditions of extreme humidity or where maximum re-use is required, Ext-Dfpa plywood, produced by the hot-pressed resin-bonded method, is recommended.

Copies of this pamphlet, or of the 12-page booklet Form 38-90 giving complete data on the use of Plyform panels for concrete forms, will be mailed to users and specifiers upon application to the Association. Just mention this publication.

### PLAN YOUR HIGHWAY POSTWAR PROGRAM NOW Include TUTHILL GUARD RAILS

*in Your Specifications*

SOUND planning, foresight, wise economy and seasoned judgment are combined when you specify in your Highway Postwar Program the well-known, widely used TUTHILL GUARD RAIL.

TUTHILL convex design and spring-like, deflective action, assure maximum safety, exceptional visibility, attractive appearance, economical installation and low-cost maintenance. Available now for complete installations, maintenance and repairs.

Pacific Coast Manufacturers and Distributors  
U.S. SPRING & BUMPER CO., LOS ANGELES, CALIF.

Write For Detailed Specifications



**TUTHILL SPRING COMPANY**  
762 POLK ST., CHICAGO 7, ILL.

# Ransome PAVERS

## ... set the pace on airport runway construction

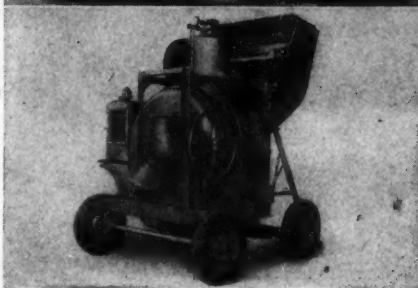


34-E DUAL DRUM PAVES ON AIRPORT CONSTRUCTION WORK

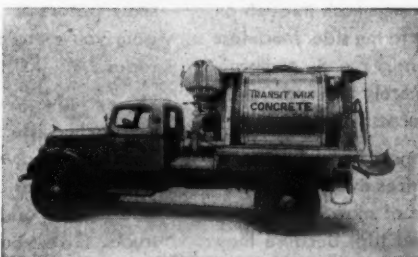
During the early days of the war, Army and Navy training programs called for the construction of a great many large airports . . . in the shortest possible time. Ransome Pavers went to work laying runways and hangar aprons.

These big machines, producing up to 121½ cubic yards per hour with a one minute mixing time, stayed on the job as long as twenty-four hours a day, seven days a week. New production records were hung up—airports were finished far ahead of schedule.

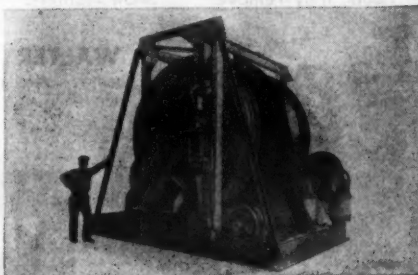
Ransome 34-E Dual Drum Pavers have many features making for efficient operation and trouble-free performance. Write for literature.



PORTABLE MIXERS



HORIZONTAL AND HI-UP TRUCK MIXERS



CENTRAL PLANT MIXERS

# RANSOME

## MACHINERY COMPANY

DUNELLEN  N. J. - U. S. A.

SUBSIDIARY OF WORTHINGTON PUMP AND MACHINERY CORPORATION



## James J. Skelly

(Continued from page 7)

does grading and all kinds of concrete work, and also has equipment for rent. For the past two years it has had fifty men on grading operations, building fire banks, installing a 6-foot sewer 15 feet deep, and constructing roads for the high-octane-gasoline storage plant of the Sun Oil Co. at Marcus Hook, Penna.

"And that job is about all I can handle right now, with my two boys in the service and the present labor shortage in the construction industry," said Skelly. "I'm not looking for any more work. Before the war I was practically retired; now I am on the job every morning before 7 o'clock."

The James J. Skelly Co. is a partnership of the father and his two sons, Capt. Joseph J. Skelly, 38, and 1st Lieut. J. Paul Skelly, 28, both civil engineering graduates of Villanova College and both in the U. S. Army Engineer Corps in France. Since their college days the younger Skellys have worked with their father on construction jobs and had become superintendents. When war broke out they left for the Army.

"Most of my contracting work has been fairly close to home," Skelly went on. "At first I lost money in transporting equipment when I ranged too far afield, but I have since managed to find enough work in southeastern Pennsylvania to keep me busy. I have also built some bridges and dams around these parts. I remember one concrete dam I built near Media and the almost daily visits I had from the president of a bank who loaned me some money to finance the contract. That bank president was mighty concerned over his investment and thought I was surely going broke. I fooled him, however, paid back the loan with interest, and would not mind having a few such jobs like that today."

### First Clover Leaf

"One tough job I had was building a 5-mile section in 1939 on U. S. 1, a three-lane concrete highway just outside Media on the road to Baltimore. That contract was for \$750,000, but the job was full of headaches with quicksand, rock, heavy ground water, and every obstacle you could possibly think of. That job, by the way, had the first clover-leaf

type of intersection in the state of Pennsylvania."

No one enjoys a joke more than Skelly and he is capable of a little kidding of his own. On one of his concrete road contracts, after he had arranged to buy his cement from a certain firm, a competing cement company called, asking for his business. With a straight face, Skelly told the representative of this company that in order to get his cement business he would have to pay for the clearing and grubbing on the contract. "That salesman yelled bloody murder," laughed Skelly, "but when I was bidding my next contract, I'll be darned if he didn't call me up and tell me to take it easy and not bid too high on the clearing and grubbing item. Incidentally he sold me cement on that job and without any strings attached."

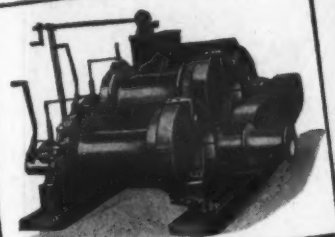
### Association Activities

Seven years ago James J. Skelly was elected President of the Associated Pennsylvania Constructors and has held that

(Concluded on next page)

## Hoists to Fit the Job

Lidgerwood hoists have earned a 70-year reputation for dependability and efficiency on the job. There's a Lidgerwood gasoline, steam, electric or Diesel hoist to fit every construction need. When you need a hoist inquire first of LIDGERWOOD.



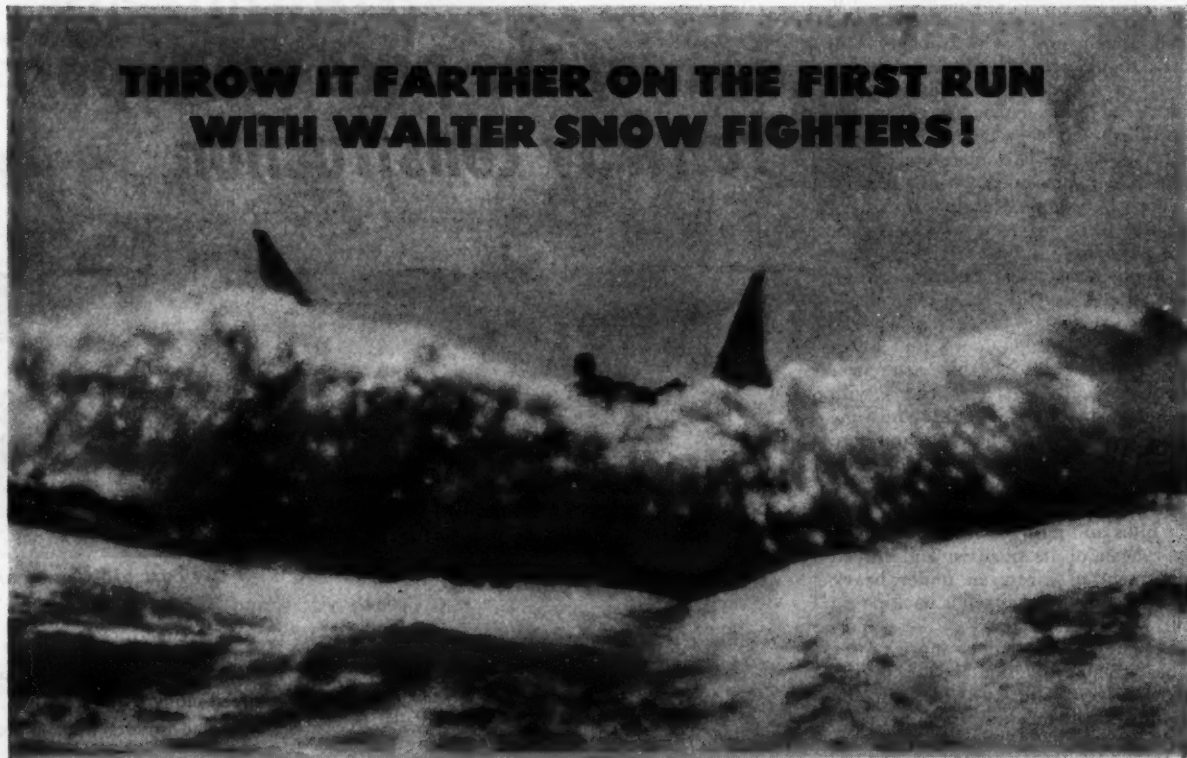
HOISTS FOR:  
CABLEWAYS  
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**LIDGERWOOD**  
ESTABLISHED 1873

Manufacturing Company  
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## WHY MOVE THE SAME SNOW Twice?

THROW IT FARTHER ON THE FIRST RUN WITH WALTER SNOW FIGHTERS!



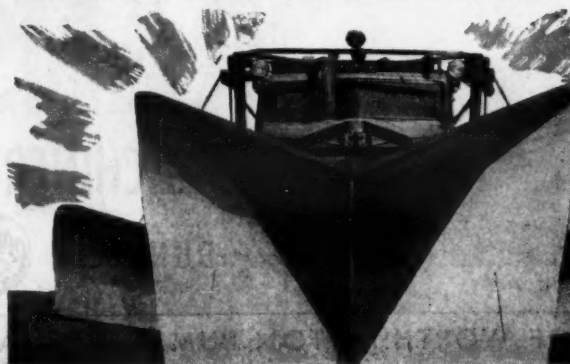
When hard-hitting Walter Snow Fighters smash through on their opening runs, they throw snow far to the side. Much less snow remains to be rehandled on the next run. By comparison, slow-moving snow removal units merely turn snow over, piling it higher and higher for each successive run.

Walter 250 h.p. Snow Fighters clear snow faster (up to 30 m.p.h.) because unmatched traction utilizes every last horsepower. They remove a greater volume of snow on each run (clearing a two-lane road in one round trip) because they are designed to mount the biggest, most efficient plowing equipment. By clearing more miles per hours, they remove

snow before it packs and freezes into dangerous ruts—gain you extra time for opening more miles of secondary roads.

The exclusive Walter Four-Point Positive Drive provides this outstanding performance. Automatic locking differentials proportion power to FOUR driving wheels according to their traction at any instant—eliminating the wheel-spinning, side-slipping and stalling that slow down or stop conventional trucks. Give your highway system this fast, unfailing protection. Write today for complete literature on Walter Snow Fighters.

WALTER MOTOR TRUCK COMPANY  
1001-19 IRVING AVE., RIDGEWOOD 27, QUEENS, LONG ISLAND, N. Y.



**WALTER  
SNOW FIGHTERS**

THEY SPELL

"Real Safety"

EMBURY

**Luck-E-Lite**

**HIGHWAY TORCHES**

Lowest Cost for Highest Dependability



Order through Your Jobber

EMBURY MFG. CO., WARSAW, N. Y.



## ARBA President

(Continued from preceding page)

office ever since. During that period it has grown into one of the largest state organizations of contractors, with 170 contractor members and 300 service members made up of such allied companies as equipment manufacturers, material and supply houses, quarries, bonding and surety firms, etc.

Mr. Skelly would like to give up the presidency of this state organization and devote all his time to the ARBA. Since he has been head of the Highway Contractors Division for the past two years, that section has grown to be the largest and perhaps the most important in the American Road Builders' Association. He has assisted in forming units in Virginia, and North and South Carolina, the newest affiliates of the national body.

### ARBA Program

With Charles M. Upham, Engineer-Director of the ARBA, and A. E. O'Brien, Executive Secretary of the Associated Pennsylvania Constructors, Skelly has gone up and down the country covering fifteen states, talking to governors, highway department officials, contractors, etc., and has spoken at more than twenty-five luncheons and dinners of service clubs, composed of members of allied highway industries, on the subject of post-war highway planning. The trio has been emphasizing the importance of having surveys, plans and right-of-way takings in readiness at the end of the war so that service men and discharged war workers can find employment in the construction industry at once, without having to be subjected to another WPA or similar program.

This educational drive is producing results, with several states already working on programs which are larger than any they have had in the past. To cite two examples, Pennsylvania is developing a \$500,000,000 post-war highway program to be spread over a 5-year period, while North Dakota has a \$15,000,000 bond issue for financing its highway planning.

"About plans of the ARBA," said Skelly, "A three-point program is shaping up that includes our immediate objectives. These are, first, an adequate highway program on a national scale with the necessary Federal legislation to

finance it; second, a plan to dispose of surplus road building and highway equipment so that this machinery will not be transferred to other units of government which would set up a day-labor system of road work in competition with private enterprise; and lastly we want to build up our Airport Division in the ARBA. Building airports, we feel, is well within the province of a road builders' organization, since the grading and paving of runways is being done by highway contractors who naturally are cut out for this type of construction since they have the machinery and the men with the know-how. Airport construction, it goes without saying, is going to become more and more important in a very short time."

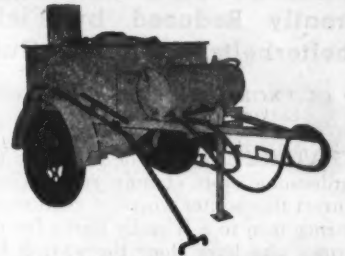
For this national highway program, Skelly wants to get contractors and engineers together to crystallize their point of view. Personally he favors a program of wide express highways which would tie the country together, as opposed to small grants to townships and counties scattered widely over a large area where improvements would necessarily be strictly local in character.

"Some years ago," Skelly explained, "I spoke before a business men's club in Clifton Heights, Penna., and recommended that Route 1 be given a new location in its reconstruction so as to by-pass the town. I felt that through traffic between Baltimore and Philadelphia would not stop, and that local residents finding their own business section so congested with traffic would take their trade to neighboring communities. I was promptly sat on then, but I think the town feels different now."

"Being President of the ARBA will no doubt take up plenty of my time. If my boys were only home with me, I could turn the business over to them, send my wife to Florida for the winter, and then this new job would be a lot of fun. Instead it will probably be a lot of hard work. But come to think of it, that's what I've been doing all my life anyway and I'm none the worse for it."

In addition to his contractors' associations, Skelly is a Director of the Delaware County Chamber of Commerce, a Director of the First National Bank of Media, and President of the Nether Providence Township Park and Recreation

Board. He has just been nominated as President of the Associated Pennsylvania Constructors for an eighth term, and also elected a Director of the Keystone Automobile Club. The "walking boss" of a railroad construction gang has walked a long way in not too long a time.



### HEATING KETTLES

Fire Proof—Oil Burning

Hand and Motor driven spray. Many sizes. Write for catalog.

White Mfg. Co.

ELKHART

INDIANA

# after VICTORY

We enter the new year with a profound feeling that Victory is not far away—that soon LIMA Shovels, Cranes and Draglines will be coming off the assembly lines ear-marked for peacetime operation.

When peacetime comes LIMA will have a line of Shovels, Cranes and Draglines that will be especially designed and built for the big jobs that you have planned for the future. This war has provided a tough proving ground for excavators and material handling equipment. It has brought to the forefront the ruggedness and dependability of LIMA-MADE equipment, built to perform under extreme pressure. As their wartime task continues, LIMA engineers continue to make improvements in design and construction that you may have, after Victory, the best shovels, cranes and draglines built.

**LIMA LOCOMOTIVE WORKS, INCORPORATED**  
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Shovel and Crane Division

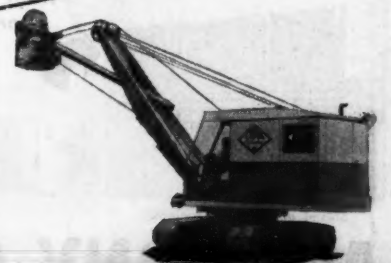
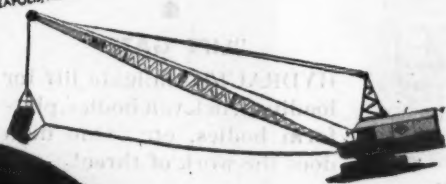
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# LIMA

## Shovels-Cranes Draglines

A Type and Size  
FOR EVERY JOB

# WANTED!

Reliable and aggressive organization, experienced in selling equipment to the CONCRETE construction industry. Frankly we are interested in a sales and service organization capable of meeting the Contractor on his own ground. To the Equipment Distributor who is willing to use plain horse sense, initiative and enthusiasm we offer the exclusive sales franchise for our top-quality products.

To the live wire sales staff we offer the best-engineered... highest speed... Concrete Vibrating equipment in the world. Manufactured by the originators of Internal Concrete Vibration.

Protected territory, consistent advertising program, liberal discounts, and immediate shipment of equipment upon receipt of orders.

Write today to

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726 South Flower Street  
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# Nature Removes Snow Almost Without Cost

**"Believe It or Not," Your Snow-Removal Costs Can Be Greatly Reduced by Field Shelterbelts, Rounded Cuts**

By CLIFFORD A. BETTS, U. S. Forest Service, Washington, D. C.

† NATURE can be made to reduce the burdensome costs of snow removal and convert this winter worry of road maintenance men to a friendly flurry for the farmer who lives along the way. It has been found in some windy western states, for example, that road cuts can be made self-clearing if streamlined so that prevailing winds sweep through and clear out the snow. In addition, roadways raised slightly above the surrounding terrain in flat country, and with long flat side slopes, are also swept clear of snow.

Of even greater importance is the discovery that, when properly placed, trees can become a living snow fence while holding needed moisture on the fields adjacent to highways. In planning such roadside shelterbelts, to serve in lieu of snow fences, the technique developed in the midwestern states by the Prairie States Forestry Project, formerly of the U. S. Forest Service and now transferred to the Soil Conservation Service, has been found helpful.

## Design of Field Shelterbelt

Like the farmstead shelterbelt, the

most effective field shelterbelt is one composed of shrubs, conifers, and several kinds of broadleaf trees in the main body of the planting. This type of planting is more likely to develop typical forest conditions to such an extent that the trees and shrubs may reproduce themselves naturally. At least one row of shrubs should be planted on the windward side of the belt; next to the shrubs one or two rows of conifers; and finally the intermediate-to-high tree rows.

It is not possible to give detailed information on the arrangement of all the intermediate species that might be used. Generally, however, the longer-lived slower-growing species, such as hackberry, ash, oak, walnut, and American elm, should be planted next to the conifers, with the faster-growing short-lived species planted toward the field side. This will permit removal of the short-lived fast-growing trees when they have served their purpose, without affecting the value and effectiveness of the rest of the belt.

The composition of intermediate shelterbelts depends upon the number of rows. A low-branching dense-growing tree or high shrub is recommended for single-row belts, and for two or more rows shrubs in combination with taller tree species.

## Keeping Roads Open

The location of shelterbelts so that they will exert the greatest beneficial



U. S. Forest Service Photo

A cross-section view of a field windbreak on a Prairie States Forestry Project in Stafford County, Kansas, shows the same type of planting used for roadside shelterbelts to trap snow off the roadway.

influence on the fields they are planned to protect, and at the same time not be a serious menace to traffic by trapping snow on highways or obscuring visibility, is a matter which needs careful consideration, particularly in the northern and central regions.

Intermediate shelterbelts, whether on the north or south side of the road, should be set infield from the road. If

placed along the fence line adjacent to the road, they not only trap the snow in the highways but in addition the surplus moisture is lost for the fields.

Basic shelterbelts, ten or more rows in width, if planted on the south side of the road, should be set infield, if at all possible, for the same reason that the intermediate belt should be set infield.

(Concluded on next page)

# PARSONS 250 TRENCHLINER



To suit varying job specifications, the digging depth of the Parsons 250 Trenchliner can be quickly adjusted to 6, 7, 8, 9, 10, 11 or 12 feet. Changes are made by lengthening or shortening the telescopic boom. Whether operating with boom telescoped to the shortest

length or fully extended to the maximum length, the correct digging angle is maintained. Main boom body is heavy welded structural steel box girder construction unit. Sliding into the main boom body is a reinforced box section extension to form an adjustable high strength boom.

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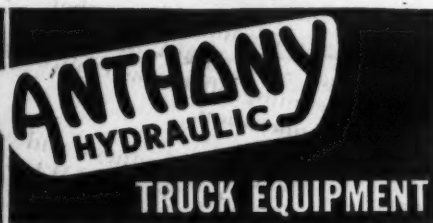
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Solves manpower problem.



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## Live Snow Fence

(Continued from preceding page)

If the basic shelterbelt is planted adjacent to the north side of the road, as is generally recommended where storms come from the north, it is not usually necessary to set the belt infield to avoid trapping snow in the highway. In a ten-row belt, most of the snow will accumulate within the belt where it will do the trees some good, and little will go beyond and onto the highway. Also, the back-up of snow will be on the field where the additional moisture will aid materially in increasing crop yield, especially where contour plowing and planting are used by the farmer.

Sometimes, however, due to local topography and meteorological conditions, the inside row must be set 50 feet or so from the road. If the belt is narrower than ten rows, it should be set back 60 to 100 feet from the road. In regions of very heavy snowfall, it may be desirable to leave a snow trap of 25

to 50 feet between the outside shrub rows and the rest of the shelterbelt.

Where gaps must be left through the belt, the opening should be at an angle so that the wind will not have a clean sweep. Furthermore, intermediate belts of a few rows are often needed at critical places.

The spacing of the individual trees depends upon the variety used, but, as a general rule, it should be 6 to 10 feet for trees and 3 to 4 feet for shrubs.

## Easements for Work Outside Right-of-Way

The use of special easements to enter property off the highway in order to perform erosion-control or planting work is common in Indiana. The State Highway Commission of Indiana often takes a temporary right-of-way grant when purchasing its regular easement, for channel change, run-arounds, special grading or sodding. This is in the form of the standard right-of-way grant

except that it is marked as a temporary grant, permitting the property owner to retain control and fencing rights as soon as the work is completed. These grants are sometimes free and sometimes are paid for by the State. They are often incorporated into the plans as a temporary grant.

H. J. Schnitzius, Landscape Supervisor, State Highway Commission of Indiana, reports that several widening jobs have been done on narrow roads as a force-account maintenance or roadside-improvement project where the permission of property owners has been obtained to permit access and work on private property. This usually took the form of a letter granting permission to do certain specified work. In some cases the letters permitted the Highway Department to remove the fences, regrade eroding slopes, and to re-erect the fences. Mr. Schnitzius reports that as far as he knows there has never been a complaint of any kind from property owners as these jobs are usually mutually beneficial, and if performed prop-

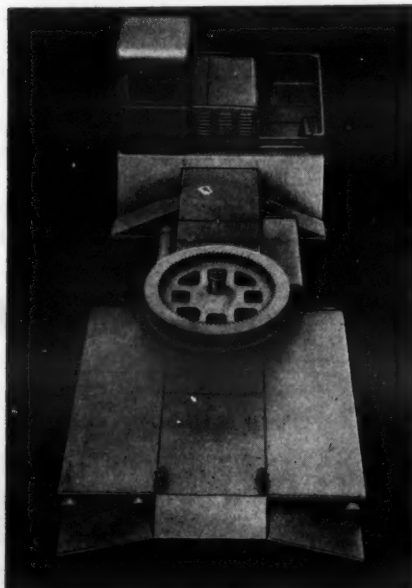
erly, work to substantial advantage to both the property owner and the state. Because each case is usually different from the others, it has been found that a letter granting permission and establishing responsibility is easier to use, and easier for the usual landowner to understand, than a formal legal form.

# Built to take the TOUGHEST STRESSES and STRAINS

From every angle, the Michigan Shovel-Crane is a "brute for punishment"—always ready to take the toughest stresses and strains without a whimper. Glance at the illustrations of the frame-chassis below, and you'll see one of the main reasons why. But, equally important—balanced design and outriggers (optional) distribute weight on the big, rugged pneumatic tires in such a way as to provide maximum stability and low unit ground pressures. As a result, Michigans can work and travel in really tough spots with speed and safety. Peak performance—even under adverse conditions—is always assured. Get all the facts about Michigan  $\frac{3}{8}$  and  $\frac{1}{2}$  yard shovels—with crane attachments of 6, 10, and 12 ton capacities. Write for Bulletin CE-15.



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## Airports of Future

(Continued from page 54)

be called "airparks". Second, there are the larger terminals for airline operations which will become transportation centers in the same way that the railroad station has been in the past.

While some additional large air terminals will be needed, the Civil Aeronautics Administration emphasizes the importance of the smaller types of landing fields in any future building program. They number about 2,900 out of the total 3,000 new fields proposed. It is our belief that if we are to have a thriving aviation industry, it must have its base in the grass roots of our country. That means, first of all, flying fields located within easy reach of homes and offices, and designed for the small private aircraft, which many individuals will own or rent. It also means fields a bit larger, but still modest in size, for local commercial air service to and from the thousands of small communities not now accessible by plane.

The total cost of such a program would be a little more than \$1,000,000,000. This is a large sum but it is small in comparison with the \$25,000,000,000 which this country has spent on roads in the last 25 years.

It should be emphasized that there is in existence neither appropriations nor legislation establishing the machinery for such an airport program. It is merely a survey of our airport needs, which has been submitted by the Civil Aeronautics Administration at the request of the House of Representatives.

### Proposed Legislation

The proposal in question would appropriate to the Civil Aeronautics Administration \$100,000,000 a year for the next ten years, to aid the states in constructing airports which fit into the national plan drawn up by the CAA. The Federal contribution is not to exceed one-half the total cost. Thus, if the states match in full the Federal appropriation of \$100,000,000 each year, it would be possible to complete within five years the \$1,000,000,000 program which will be submitted to Congress by the CAA.

This depends, of course, on how rapidly the states set up the necessary machinery for such cooperation. According to the bill now pending, states desiring to qualify for Federal aid on airports would have to establish a state airport agency, provide it with necessary funds for development and maintenance, and authorize the prevention and removal of airport hazards by zoning. The construction of these airports would be supervised by the state agency, in accordance with CAA standards, and only projects included in the national plan would be eligible for Federal aid.

A formula is proposed for allocating funds among the states, along the lines of the Federal-state highway program. With the ultimate aim of equalizing the degree of airport development throughout the country, it gives weight to the

number of existing airports in each state in relation to its area, population, and number of registered aircraft.

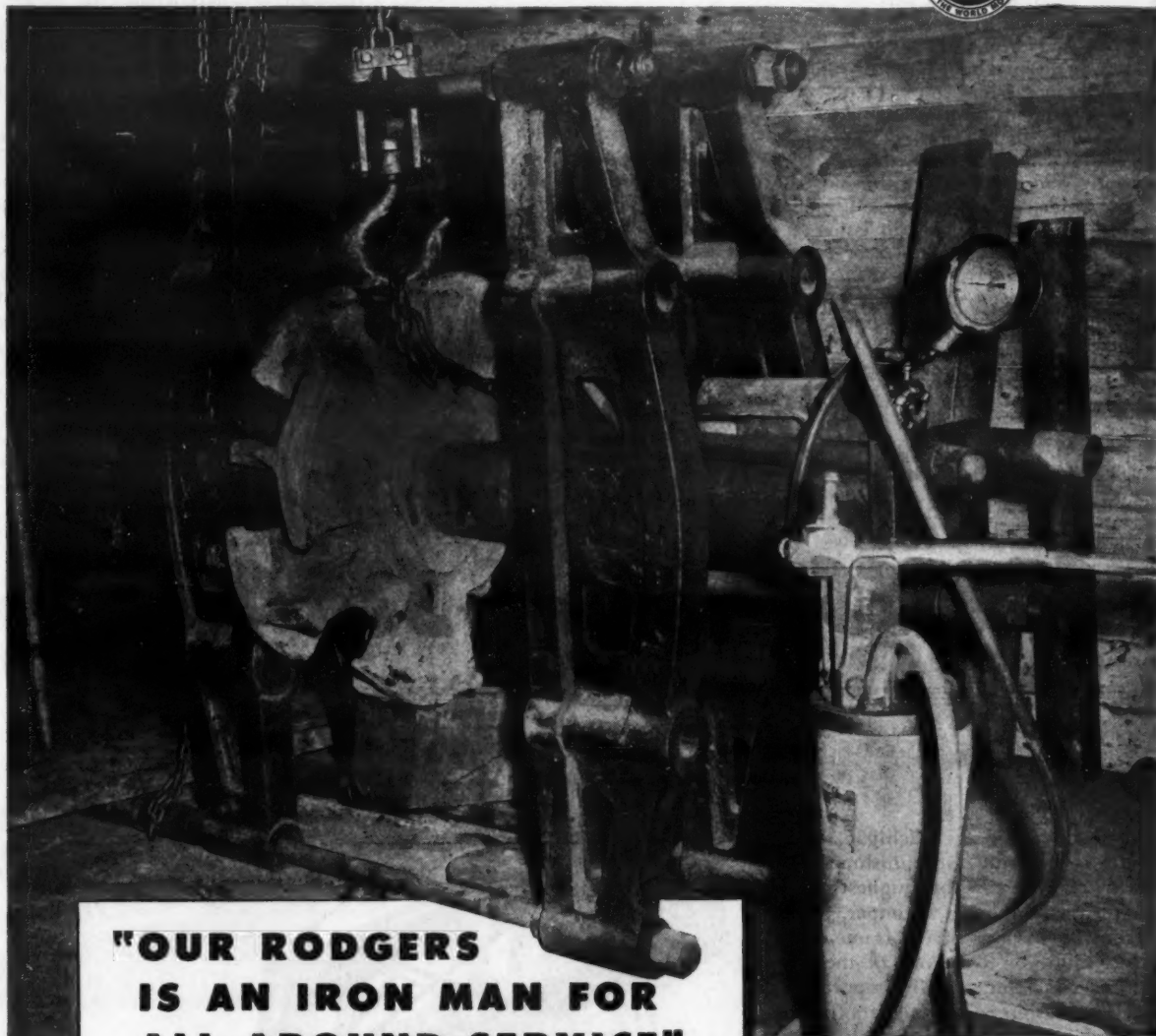
Since this is a program which calls for the closest cooperation between Federal, state, and local authorities, it will obviously take time to arrange the many

details which must precede actual construction. Under the most favorable circumstances, the program will take five years to complete, and by that time we have every reason to believe that 6,000 airports will be urgently needed to satisfy even the minimum requirements of

aviation. Meanwhile, it is very possible that useful public works of this kind may be necessary to cushion the transition from war production to peacetime manufacturing.

From a paper presented at the Southeastern Airport Management Conference at the Alabama Polytechnic Institute, Auburn, Ala., 1944.

NO. 23 OF A "READY-WITH-A-RODGERS" SERIES



**"OUR RODGERS  
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*Pulling a Diesel shovel sprocket gear at the mine with a Rodgers Universal Press.*

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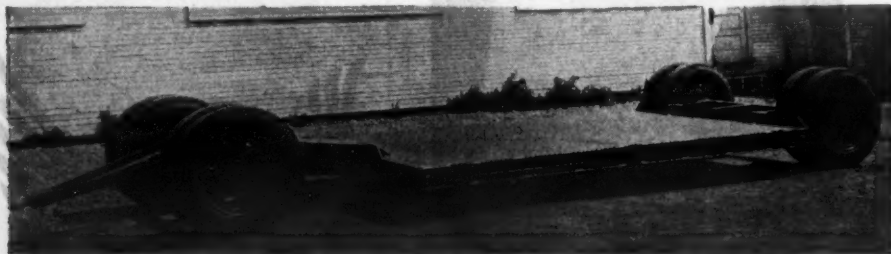
From the Minnesota iron country comes this report on another Rodgers Universal Press that is doing a

whale of a job servicing equipment. The Rodgers Universal can be used wherever portable pulling or pressing power is needed. *If it's a Rodgers, it's the best in hydraulics.* For complete information and prices, write or wire Rodgers Hydraulic, Inc., 7415 Walker Street, St. Louis Park, Minneapolis 16, Minnesota.

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## New Simple Charts For Withholding Tax

The revised income-tax law became effective January 1, so that every contractor, through his office manager or bookkeeper, must withhold a certain percentage of every wage paid. In order to make easier the computation of these deductions, Delbridge Calculating System, Inc., 2502-10 Sutton Ave., St. Louis 17, Mo., has published new simplified withholding tax charts. This company has been a specialized publisher in the calculating table field since 1890.

The Delbridge Simplified Withholding Tax Chart is published in four editions covering weekly, bi-weekly, semi-monthly, and monthly payroll periods. Each edition also shows daily and miscellaneous deductions for periods from one to six days inclusive. The chart also covers the 18 and 22.5 per cent rates.

Complete information regarding these tax charts may be secured by writing direct to Delbridge and mentioning this review.



The new Delbridge withholding tax chart and a sample page.

## New Trucks for 1945

The manufacture of heavy-duty trucks has been stepped up 35 per cent since last June, but production still is not up to schedule, according to a WPB report to automotive industry representatives in Detroit. WPB is urging truck

companies to make every effort to increase their output during the first quarter of 1945.

Lack of castings and forgings for engine blocks, transmission cases, and other equipment component parts is the biggest snag in the heavy-truck program. Another critical item is heavy-duty truck tires. Inability to employ additional workers persists, despite the fact that foundries have had preferential manpower treatment and, in some instances, have spent large sums to improve working conditions.

Prospective purchasers of new heavy-duty trucks in makes and models no longer available from production in 1944 may make application at once to their ODT district offices to purchase such vehicles out of production slated for 1945.

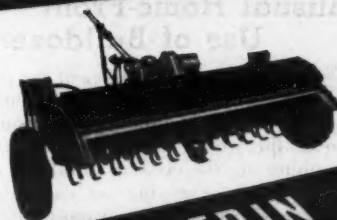
## Revolving Generators

Katolight revolving field generators, series 667 and 670, are described in an illustrated 4-page bulletin which has

been published recently by the Kato Engineering Co. of Mankato, Minn. These generators are available in 5, 10, 15, and 25-kw sizes, 4-pole, and in 10, 15, and 25-kw, 6-pole.

Highway engineers and contractors who are interested in these revolving field generators may obtain copies of this folder by writing to the manufacturer and referring to CONTRACTORS AND ENGINEERS MONTHLY.

## ARIENS AGGMIXER



FOR MIXED IN PLACE CONSTRUCTION  
A THOROUGH JOB OF  
PULVERIZING  
AND MIXING

ARIENS Aggmixer does the job thoroughly, rapidly, and economically with whatever aggregates and binder are used, such as all types of bitumens, clays, cements, chlorides, etc., by the swirling, chopping action of the tines—wet or dry. Operates in connection with other general purpose road equipment. Easy and safe to operate—adjustable to any tractor. Hydraulic adjustment for depth is simple and positive. Made in 4 sizes, with normal cutting widths 4', 5', 6' and 7'. Ask for complete information and job facts sheets.



Our faith in things democratic must burn as white hot as that of our enemies in their philosophies.

—HALIFAX



ARMY SIGNAL CORPS PHOTO

## NOT IN THE BOOK- But All In The Day's Work

Red coral of tropical islands wasn't given much consideration when the "daddy" of this OSGOOD shovel was designed.

Yet today dependable OSGOOD "20's" are perfectly at home, excavating road and runway material from rock-hard coral pits of South Pacific Islands and otherwise doing their part along the "trail to Tokyo and Victory over the Japs."

Such "digging ability" is typical of daily OSGOOD performance under *all* conditions (often under enemy fire) from the tropics to the tundras. It is evidence of the power, stamina and versatile OSGOOD efficiency that peace will divert to *your* requirements.

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SHOVELS, DRAGLINES  
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One of the two bulldozers which removed 350 yards of earth to form a huge well, pushing the excavated material through a side wall.

### Unusual Home-Front Use of Bulldozers

There have been many tales of the unusual uses to which the versatile bulldozer has been put on the fighting fronts all over the world, but while this has been going on, the civilian bulldozer at home has been carrying on valiantly, though less spectacularly in most cases.

An unusual home-front job accomplished by bulldozers has recently come to our attention, consisting of digging a well. This well, 59 feet in diameter at the top, 44 feet deep, and 24 feet in diameter at the bottom, was dug by two bulldozers in 10 days operating time, removing 350 yards of dirt. Located at Salem, Ore., near the Willamette River, the well will have a diameter of 18 feet inside the concrete casing and will supply a nearby industrial plant with 8,640,000 gallons of water required for daily usage. Water from the river will enter the well, whose bottom is 12 feet below the bed of the river, through a 36-inch flume.

### Lesson to Be Learned From Past Experience

The experience of the Public Works Administration has a lesson for us in these days, Major General Philip B. Fleming, Federal Works Administrator, pointed out in his speech at the dedication of the Chicago subway. The PWA was conceived and created at a time when some 15,000,000 of our fellow citizens were walking the streets in a vain search for work.

"We got a small staff together," General Fleming said, "and sat down around a table in what is now the Federal Works Building in Washington and stared at each other for several minutes. What were we supposed to do next? We re-examined our instructions. We were to evolve a nation-wide integrated plan of needed public works by which the unemployed could be put to work quickly. But the instructions seemed somewhat inconsistent. For if we were going to achieve a national program, a good deal of time would be required. It seemed as though we would have to take a year off and go around the country and see what was needed, what would be most useful, and try to integrate all the various suggested projects into one overall plan that would make national sense. But there was the other horn of the dilemma. The unemployed were clamoring for jobs and our instructions were to put them to work quickly. We resolved our doubts by deciding to go out and get some construction started immediately.

"But construction has to be planned. Engineers must make surveys, architects must create designs. Draftsmen must produce working drawings. Cost estimates must be made and specifications written. Sites must be acquired, sometimes by the slow process of condemnation in the courts. We found that plan-

ning on certain Federal projects had been advanced to a point where some construction could be started at once. But as for the states, cities, and counties of the country, plans simply did not exist. After a while the applications began to come in. Most of them were little more than crude sketches. In the vast majority of cases, no engineering had been done, no working drawings existed, and no sites had been acquired. In a number of instances, legislative authority to permit the construction desired was lacking. Bills had to be drafted, introduced into the state legislatures, and enacted. All of these time-consuming things had to be done before large-scale construction could be begun, and a year and six months passed before it was possible to put as many as 100,000 men to work at the non-Federal sites."

General Fleming has pointed out a lesson which it would be inexcusable for us to ignore or forget. To insure public works construction when it is needed, plans must be made now, so that actual construction may begin at the time it will best serve to provide jobs.

### A New Safety Code Aids Construction

An American Safety Code for the construction industry has recently been approved by the American Standards Association. The purpose of the Code is to summarize the best practices in vogue throughout the construction industry and to make them available, in the simplest possible form, to all members of the industry. Its purpose is, therefore, primarily educational. Its usefulness will depend upon the degree of voluntary acceptance by individual companies.

While the code applies specifically to building construction and contains the basic requirements for operations usually encountered in such work, its thirteen major parts are worthy of study by any construction man because many of them apply to heavy construction. The Code covers demolition, excavation, welding and cutting, piling, handling and storing materials, blasting, compressed-air work, derricks, scaffolds, ladders, hoists and elevators, temporary floors, stairs, railings and toeboards, and housekeeping on construction projects.

Copies of this Code A10.2-1944 may be obtained from the American Standards Association, 70 E. 45th St., New York 17, N. Y., at \$1.10 per copy.

### Off-the-Road Tires And Truck-Tire Data

A new 12-page illustrated bulletin has been issued by Kelly Springfield Tire Co., Cumberland, Md., showing the various types of truck and off-the-road tires made by this company, with the various

treads for most effective service. This bulletin also contains complete tables of sizes, capacities, and dimensions for highway service as well as for mud, snow, and soft surfaces and for hauling over hard rock or in timber. A table of tractor and implement tires is also included.

## SPEEDIER CONCRETE FINISHING with

# CALCIUM CHLORIDE IN THE MIX



Faster hardening with calcium chloride in the mix enables finishers to complete their work the same day the concrete is placed, to avoid lag in finishing at high overtime rates of pay.

Finishing schedules can be better controlled. Varying amounts of calcium chloride can be used to compensate for temperature changes and to adjust time of hardening to meet finishing needs.

Concrete with calcium chloride works easier and finishes better, leaving less voids and fewer defects for later pointing up.

Read the details in our booklet, "Early Strength Concrete." Ask for Bulletin No. 28.

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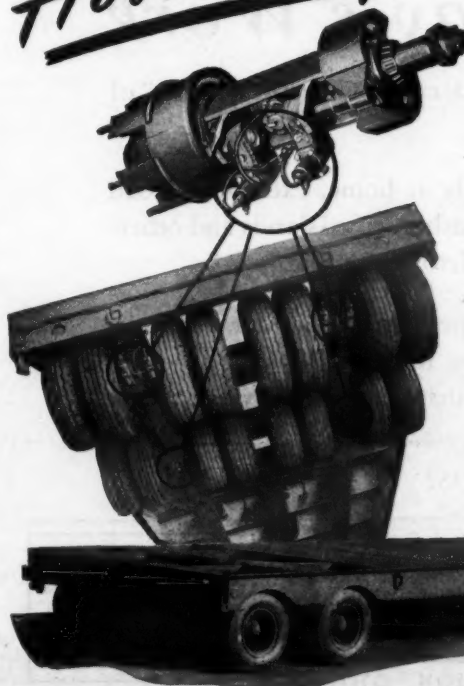
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SPEEDS WINTER CONCRETE CONSTRUCTION



## Here's Why



## Jahn Trailers

have faster, smoother braking action

They're equipped with hydraulic brakes which provide the same efficient and safe hydraulic braking action used on trucks and pleasure cars. This new application which was perfected by Jahn engineers assures positive, equal brake pressure on all wheels and consequently smoother, faster braking action. Even when trailers are travelling over very rough terrain there's no possibility of partial application or dragging of the brakes. Safety is increased and maintenance simplified.

Jahn heavy duty trailers are offered in a wide range of sizes from 5 to 100 tons with any axle or wheel combination. Every detail is fabricated with such extreme care and skill that no Jahn trailer has ever failed from carrying its rated capacity load. For the answer to all your heavy duty trailer problems come to "Trailer Headquarters."

C. R. Jahn Company, 1347 W. 37th Place  
Chicago

Any Axle or  
Wheel  
Combination



"COME TO TRAILER HEADQUARTERS"



# Illinois Brick Road Topped with Hot-Mix

(Continued from page 69)

clamshell bucket unloaded the aggregate from the cars, stockpiled it, and then fed the material to the hoppers whence it was brought by bucket conveyor to a 72-inch-diameter x 24-foot-long drier. The drier was heated by a Little Gem fuel-oil torch and powered by an International 6-cylinder diesel AD-14 engine, while the rest of the plant was powered by a Caterpillar 6-cylinder D13000 diesel. The 150-hp horizontal Nagle boiler was also fired by a Little Gem torch.

The aggregate was next raised to the Ludlow 4 x 12-foot vibrating screens where it was graded for the mix before being admitted to the pugmill. The temperature of the mix when dumped into the trucks was approximately 250 degrees F for the binder, and 275 degrees F for the surface course. Fifteen men were employed at the asphalt plant.

## Mix Proportions

The batch weights of the binder and surface courses were as follows:

Material	Weight of Courses (Pounds)	
	Binder	Surface
Crushed stone, 3/4-inch	1,050	—
Crushed stone, 1/2-inch	600	1,350
Stone chips, 1/2-inch	—	345
Coarse sand, No. 4 sieve	330	—
Fine sand, No. 10 through No. 200 sieve	870	1,005
Mineral filler	—	120
Asphalt PA-1, 65 penetration at 77 degrees F	150	180
	3,000	3,000

In each course the stone aggregate and sand were mixed dry in the pugmill; for the binder at least 5 seconds and for the surface 15 seconds, after which the asphalt was added and mixing then continued for another 30 seconds. The leveling course is the same as the surface course except that the mineral filler of stone dust, 100 per cent passing a No. 30 sieve and 75 to 100 per cent passing a No. 200 sieve, was omitted.

## Quantities and Personnel

The major quantities involved in this contract were:

Bituminous prime coat, EA-1	6,927 gals.
Asphalt leveling course	637 tons
Asphalt binder course	6,152 tons
Asphalt surface course	5,747 tons
Concrete base, 9-inch uniform	1,749 sq. yds.
Crushed-stone shoulders	2,290 tons

This bituminous resurfacing was done for the Illinois Division of Highways, Wesley W. Polk, Chief Engineer, in District 6 of which Carl M. Wahl is District Engineer, with headquarters at Springfield. L. E. Davidson and J. M. Wilson were Resident Engineers. Thomas O. Peter was Superintendent for the I. D. Lain Co., Springfield, Ill., contractor.

## Icy Road Treatment

The ninth pamphlet in the series on Wartime Road Problems issued by the Highway Research Board is devoted to "Recommended Practices for the Treatment of Icy Pavements." Copies of the pamphlet, the recommendations of which need not be restricted to wartime practice as they are applicable whenever the described conditions prevail, are now available by writing direct to the Highway Research Board, 2101 Con-

stitution Ave., Washington 25, D. C.

This 8-page pamphlet is the work of the Committee on Treatment of Icy Pavements, comprised of J. E. Lawrence, Maintenance Engineer, Massachusetts Department of Public Works, as Chairman, and B. R. Downey, Maintenance Engineer, Michigan State Highway Department, and Norman Hill, Maintenance Engineer, Washington Department of Highways.

## Gasoline Paving Breakers Described in New Folder

A 6-page folder containing graphic illustrations and descriptive text on its line of self-contained gasoline hammers is available from the Syntron Co., 227 Lexington Ave., Homer City, Pa. These hammers are shown operating as spike drivers, paving breakers, for digging frozen ground, and for many other types

of jobs. They are described as being easily portable, one-man operated, and ruggedly constructed, with no compressor, battery, hose or springs. Moil points, spades, tampers, asphalt cutters, sheeting drivers, and a variety of auxiliary tools for use with the hammers are also illustrated.

For copies of the folder, write direct to the manufacturer and mention CONTRACTORS AND ENGINEERS MONTHLY.

# Better in the Long Run



In spite of prolonged shortages of vehicles, replacement parts and personnel, the motor truck transportation industry successfully has performed a tremendous task in supplying the nation's critical needs swiftly and economically. Now, a limited number of Ward LaFrance heavy-duty trucks for civilian use is available... trucks designed and engineered to respond quickly under all conditions and loads.

Our twenty-five years of truck manufacturing, plus the experience gained in producing specialized vehicles of war, enables us to build better civilian trucks capable of meeting every demand with reliability and low maintenance cost. Remember that, in the long run, trucks engineered to do a specific job do it better! Why not investigate by writing our Sales Department today?



# WARD LAFRANCE

TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC. - ELIZA, NEW YORK

The Rud-o-Matic Tagline is operated on a spring principle and maintains at all times a positive tension sufficient to steady a clam shell bucket under any and all conditions, and will operate perfectly with the boom at any angle. It eliminates all the grief usually encountered with the average tagline as there are no weights, trucks, pins, carriages, or sheaves to wear out or to get out of order. Because of the large bearings and fewer sheaves, the saving on cable alone would eventually pay for it.

Tagline is complete with fair lead and cable attached and can be installed in less than one-half hour. Most of the crane manufacturers have adopted the Rud-o-Matic as standard equipment.

McCaffrey-Ruddock Tagline Corp.

2121 E. 25th St., Los Angeles 11

RUD-O-MATIC  
foolproof  
TAGLINES

## FOR SALE Locomotives

4 Plymouth, 3-ton locomotives, 38" gauge; type 2, Model AL. Good condition. Attractive price.

## Boilers

Three 150-HP Walsh-Weidner HRT boilers, 150-lb. pressure. Save on these.

All the above located at Kansas City. For further information, write, wire or call

Sonken-Galamba Corp.  
Kansas City 18, Kans.



## Will Jet Propulsion Have Post-War Boom?

(Continued from page 56)

engine and the duct-type engine. The airstream thermal jet engine uses the air for its supply of oxygen. Air is sucked in at the front, compressed, and then ignites with the fuel, discharging a great volume of hot gases through a turbine wheel which drives the compressor. In this type only about one-third of the power actually is used to drive the plane.

The thermal efficiency of some types of rocket motors is remarkable as compared to other types of our propelling units today. Mr. Pendray pointed out that the overall efficiency of the steam locomotive is between 8 and 10 per cent, the automobile engine about 25 per cent, and the airplane engine as now developed reaches as much as 30 to 35 per cent. The thermal efficiency of the best regenerative liquid-fuel rocket motors amounts to as much as 45 per cent. The mechanical efficiency of all jet-propulsion motors and engines depends on the speed at which the engine itself is moving. If it is moving at the speed of the jet, then the efficiency is 100 per cent. The power of the reciprocating airplane engine is probably limited to about 3,000 hp, because of the increasing complexity of internal-combustion engines as they reach this size. Thermal-jet engines may start where the standard internal-combustion reciprocating-type engine leaves off and can probably go up to 10,000 hp or more.

### Post-War Possibilities

All of this discussion of the theory and practice of shooting rockets through the sky or of jet-propelled planes does not seem to have much application in the construction industry. It is known, however, that there is considerable interest in England as well as in the United States in the application of the principle of gas turbines, which make use of some of the features of jet propulsion, to heavy-duty engines such as are used in motor vehicles and construction equipment. Mr. Pendray feels that, at the present general knowledge of the subject, there is some doubt of the value of jet propulsion for slow-moving objects such as motor trucks and construction equipment, because this type of motor

power is essentially a high-speed unit, and when speaking of high speed it means miles per second rather than feet per minute.

We must not overlook the possibilities of jet propulsion nor scorn development. There was a time when it was thought that the diesel engine could not possibly be used to power motor trucks and construction equipment. It had been developed as a slow-moving heavy-duty engine which seemed to be limited to such service as marine propulsion, but today the diesel engine has been speeded up, its weight per horsepower reduced, and it is generally accepted as the outstanding prime mover for construction equipment. Thus, with the inevitable developments in this new field of combustion engines, jet propulsion, we may find in the course of a few years that we shall be using a new fuel in a new type of engine alongside our tried and trusted gasoline and diesel engines.

A report from London in closing: The Highway Users Conference reports that, according to Deputy Prime Minister Clement R. Attlee who spoke on this subject recently in the House of Commons, British inventors are working on an adaptation of jet propulsion to highway vehicles as well as aircraft. A Laborite member protested to Mr. Attlee's remarks, saying, "Is the speaker aware there is no general desire to have vehicles careening about the country with red-hot tails?"

### Safety on Your Crane

An automatic boom control, designed to prevent trouble before it actually starts, is described and illustrated in a 4-page folder issued by the Industrial Equipment Co., 59th & Doyle Sts., Emeryville 8, Calif. The Thomas Boom Stop automatically cuts off the power as soon as the boom is raised too high, so that the boom stops instantly without dangerous shocks and strains, and thus there is no possibility that the operator, either through carelessness or mistaken judgement, can continue operation after the danger peak is reached. The Thomas control, an air or vacuum-operated system, does not add to crane maintenance since no lubrication and very little attention are required, according to the manufacturer, and it can be installed in four hours or less.

Copies of Bulletin No. 100 describing the Thomas Boom Stop may be secured directly from the manufacturer.

## Warner Made President Of Borg-Warner Division

Arch A. Warner has been elected President and General Manager of the Rockford Drilling Machine Division of Borg-Warner Corp., Rockford, Ill., succeeding E. C. Tranter who has retired from

active management. Before joining the Rockford staff in 1941, Mr. Warner served as Sales Engineer at Detroit for the Mechanics Division, which he joined in 1938. Previously he had been connected with Universal Products and had engaged in engineering and sales of carburetors for Zenith and Stromberg.

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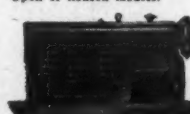
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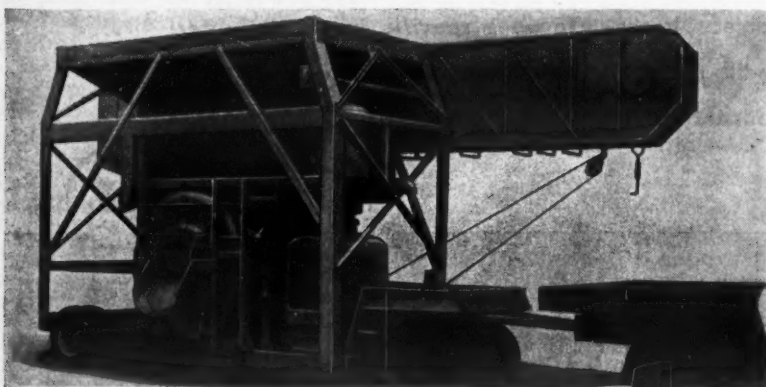
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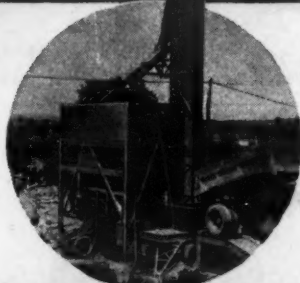
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combines in one portable unit—2 or 3 compartment storage bin—bucket elevator—AggreMeter unit to weigh batch in 15 seconds—water tank and proportionater—batching meter—pre-mixing cement feeder. Available on priority in 3 sizes. Write for booklet.



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"CLEVELANDS" Save More . . . Because they Do More





The Warco Duplex Scoop which will be available for post-war dirt-moving jobs.

## Hydraulic-Control Dirt-Moving Scoop

In order to speed dirt moving, the four models of the Warco Duplex Scoop, made by W. A. Riddell Corp., Bucyrus, Ohio, which will be available for post-war construction jobs, are fitted with hydraulic control, a simple attachment for mounting on the tractor which permits the tractor operator, by means of a single lever, to place the scoop blade in loading, carrying, or dumping position. This simple hydraulic control unit consists of a hydraulic pump driven from the power take-off of the tractor, a two-way valve and a reservoir which is connected to the hydraulic rams on the scoop. Only two lines of hydraulic hose, equipped with detachable hose fittings, are required.

The three larger models of this scoop are mounted on four pneumatic tires, while the smallest size has two-wheel mounting. The rear axle of the larger models is one piece through both rear wheels, to insure added strength and rigidity. The rear tires do not extend beyond the width of the body or the digging or cutting lines, which permits close

work on cuts and embankments.

The front end has a full-rotating tongue and axle with enough vertical oscillation to assure a short turning radius and to remove the danger of overturning the scoop when traveling over rough ground. The front tires work just inside the rear tires, making a good packing tread on fills. The body or frame is attached to the front axle by a large king pin and all hinged points are equipped with highest-quality bronze renewable bushings and steel pins.

For loading, the retracting hydraulic pistons force the blade into the desired cutting depth and loading position. For carrying, the hydraulic piston is extended to the center position which pulls the blade up into the carrying position, closing the throat and preventing loss of material, and affording good clearance. While the scoop is in carrying position, the hydraulic system is in neutral, preventing excess wear or strain on the pump. When reaching the point where the load is to be dumped, the hydraulic pistons are extended beyond the center, creating an opening at the rear of the scoop for expelling the load. Extension of the pistons for the full length draws

the entire blade and bottom of the scoop up to a vertical position to insure complete dumping.

The four models of the Warco Scoop have truck capacities of  $3\frac{1}{2}$ ,  $5\frac{1}{2}$ ,  $7\frac{1}{2}$ , and  $9\frac{1}{2}$  cubic yards, and are designed for use with 35 to 45-hp, 40 to 50-hp, 60 to 75-hp, and 75 to 90-hp tractors, respectively. Heaped capacities range from  $4\frac{1}{2}$  to  $11\frac{1}{2}$  cubic yards.

Complete information on the Warco Duplex Scoop, with specifications and illustrations, will be found in Form No. 4315 which will be sent promptly by the manufacturer to those requesting a copy and mentioning this item.

## Additional Wood Dealers

The Wood Mfg. Co., Los Angeles, Calif., has named the following firms to handle distribution of the Wood Road-mixer: Industrial Equipment Co., 415 No. 27th St., Billings, Mont., for the entire state of Montana; Wortham Machinery Co., 517 W. 17th St., Cheyenne, Wyo., for the entire state of Wyoming;

The Bode-Finn Co., 1654 Central Ave., Cincinnati, Ohio, to cover Ohio; the Herd Equipment Co., Oklahoma City, Okla., for Oklahoma; and Hunter Tractor & Machinery Co., 327 So. 16th St., Milwaukee 3, Wis., for all of Wisconsin and the upper peninsula of Michigan.

## Recent Advancements

### At Lincoln Electric

Paul James has been appointed District Manager of the Syracuse office of the Lincoln Electric Co., manufacturer of electric arc welding equipment, Cleveland, Ohio. Mr. James moves to the Syracuse office, located at 517 Erie Blvd. E., from Rochester where he held a similar position with the arc welding company.

E. L. Smith has been appointed District Manager of the company's Rochester office to succeed Paul James. The company also has transferred George S. Stevens from the factory at Cleveland, to Charlotte, N. C., as field representative and engineer.



## Interchangeable Attachments

Insley Type K Excavators—both the  $\frac{3}{8}$  and  $\frac{1}{2}$ -yd. models—are designed to handle six readily interchangeable attachments . . . shovel . . . trench hoe . . . basement hoe . . . crane . . . clamshell . . . dragline.

With any one of these attachments, the basic features of Insley Excavator design assure you of maximum mobility . . . easy maneuverability . . . low-cost yardage in the tightest spots or the toughest terrain.

Inquire now about an Insley Excavator for your postwar dirt or rock moving and material handling jobs. Be ready to specify INSLEY when conditions again permit production for peacetime needs.



INSLEY MANUFACTURING CORP., INDIANAPOLIS 1, IND.

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**NAYLOR LIGHT-WEIGHT PIPE**  
CHOSEN BY CONTRACTORS FOR  
IMPORTANT CONSTRUCTION JOBS



NAYLOR for high and low pressure air lines

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Sizes—4" to 30" in diameter—thickness from 14 to 8 gauge. All types of fittings, connections and fabrication.

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**NAYLOR PIPE COMPANY**

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NEW YORK OFFICE

350 MADISON AVENUE, NEW YORK 17, N. Y.





C. & E. M. Photo  
A McKiernan-Terry hammer driving a 15-foot wood pile for the wing-wall foundation at the New Houlton, Maine, Bridge.

## Maine Bridge

(Continued from page 50)

against a sudden rise in the river. Excavation went down to an elevation of 28.5, or 2.5 feet below the elevation as called for on the plan.

A Bucyrus-Erie 42B steam crane equipped with a 75-foot steel boom and a Williams 1½-yard clamshell bucket was employed in the excavating. For the last 2 feet, the hard pan in the downstream half had to be loosened with a pick for every bucketful. Under the upstream half, 18-ton-capacity Norway pine and spruce piles from 6 to 15 feet long were driven. These piles were 8 inches in diameter at the tip and 12 inches minimum at the butt and were driven with steel pile shoes. Nineteen piles were thus driven and cut off, leaving 3 feet of piling to be imbedded in the footing. On the back row every other pile was battered.

Pile driving to refusal was done by a McKiernan-Terry No. 7 2½-ton hammer, with the 50-hp boiler on the Bucyrus-Erie crane supplying steam through a 1½-inch hose. The leads for the driver were fastened to the boom of the steam crane and were 40 feet long, made of

two 6 x 8 timbers 22 inches apart, held in position by metal braces 2 inches wide and ½ inch thick, spaced 5 feet apart. A brace from the boom to the leads consisted of two sets of two 2 x 6's tied together and cross-braced.

### Footing Forms and Concrete

Forms for the concrete footings consisted of 5-ply ¾-inch waterproof plywood in 4 x 8-foot sections with butted joints, backed by 2 x 6-inch studs, 12 inches on centers. These were supported by double 2 x 6-inch wales secured in place by Richmond Tyscu form ties. Reinforced concrete was used for the footings and piers in the ratio by weight of 94:220:360 pounds.

Aroostook County sand, so desirable in potato farming, failed to measure up to state specifications for concrete so sand was hauled a distance of 120 miles by railroad from Bangor, Maine. The stone aggregate came from a nearby gravel pit and was crushed, washed, and screened. Portland cement was delivered in bulk to the batching plant located on a railroad siding about ½ mile from the bridge and unloaded from the railroad cars into a Butler 200-barrel-capacity cement bin. The cement was dumped into a trough in the middle of a spur siding, moved along underground by a screw carrier, and then hoisted by an enclosed bucket elevator to the bin. This system could unload a 300-barrel car in 8 hours. Deliveries were arranged so as to coincide with a day when concreting was in progress. Enough cement would then be available and the car could be emptied immediately. Sand and stone were weighed in a Blaw-Knox 50-ton-capacity batching plant equipped with a Howe 3-beam scale. A Northwest ⅝-yard gas crane kept the aggregate bins of the plant filled from adjacent stockpiles.

A six-bag batch or one cubic yard was used in concreting. Three Chevrolet cab-over-engine trucks with steel bodies carrying two batches hauled the cement and aggregate to a MultiFoote 27-E concrete paver. Water for the concrete came from the town supply, tapped with a 2-inch iron pipe. River water could not be used, as refuse from an upstream starch factory polluted it. In placing the concrete, a Blaw-Knox 1½-yard bottom-dump bucket was swung over the forms by a crane. The footing for the northerly pier took 100 yards of concrete placed in a continuous 4-hour pour. Three Mall 3-hp gas-driven vi-

brators were used.

Similar methods were used in the footings for the abutment on the south shore and for the southerly pier, but no wooden piles were necessary as a stable foundation was secured on limestone ledge rock. No sheet piling was necessary on the south abutment as a sand-bag and earth-filled cofferdam was sufficient protection from the water. The steel sheet-pile cofferdam at the south pier was further reinforced by a sand-bag cofferdam constructed between the sheet piling and the forms. The foundation for this pier ranges in depth in the ledge from 1 foot 6 inches, at one end, to 6 feet at the other end; while for the abutment the depth ranges from 1 foot 6 inches to 5 feet. Both of these footings are on ledge rock.

To obtain access to the piers for men, materials and equipment, the contractor built a falsework trestle from the north abutment. This trestle consisted of 16-pile bents of 12-inch piles with 12 x 12-inch caps surmounted by 12 x 12-inch stringers. On this was laid a 6 x 12-inch

plank flooring, 20 feet wide. This trestle was also used to support the forms for the superstructure.

(Concluded on next page)

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Termites eat while you sleep.  
Give them time and you won't  
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## HOW WEAR-LIFE IS ASSURED

Twin Disc Standard Power Take-offs and Reduction Gear units are equipped with single or two plate clutches of the gear-tooth type, depending on the horsepower to be transmitted and the diameter of the engine flywheel housing.

To assure the wear-life of the discs, well proportioned friction surfaces of ample capacity, coupled with adequate provision for heat dissipation, are provided.

To compensate for wear, the Twin Disc simple, one-point clutch adjustment is easily and quickly made through the hand hole provided for this purpose.

These features, plus the positive action which firmly clamps the friction driving plate between the two driven plates, assure efficient clutch performance and maximum wear-life. For complete description and list of standard sizes available, ask for Engineering Bulletin 129. **TWIN DISC CLUTCH COMPANY, Racine, Wisconsin** (Hydraulic Division, Rockford, Illinois).



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*Williams* **BUCKETS**

Welded Rolled Steel construction builds longer life and greater utility into Wellman buckets. Multiple Rope and Power Arm types. Dragline. Power Wheel. Special Service Buckets. ¾ to 16½ yd. capacity.

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Sales and Service Agencies in Principal Cities



## (Continued from preceding page)

## PORTABLE POWER TOOLS



## Icy-Highway Hazard Reduced with Salts

(Continued from page 44)

essential war traffic moving quickly and safely to its destination.

2. The conditioning of all standard and special motor-vehicle equipment for winter use to prevent unnecessary delays and accidents.

3. An educational program to inform drivers in regard to safe driving practices to prevent winter traffic accidents.

### Winter Highway Maintenance

As indicated by available accident facts, maximum safety on winter roads is provided when ice and snow are completely removed, leaving bare pavement surfaces. During the past year, many reports have been received in regard to the widespread use of the bare-pavement winter maintenance policy by city street departments and by state and county highway departments. Many of our Army camps, Navy bases and large war industry plants have adopted this same bare-pavement policy.

The two methods of bare-pavement maintenance most widely used are: (1) prompt snow removal and (2) straight application of sodium or calcium chloride without abrasives on the snow-covered or ice-covered surface. The application of chlorides at the rate of  $\frac{1}{4}$  pound per square yard of roadway after snow has fallen to a depth of about 1 inch will prevent the snow from bonding to the pavement, and will keep the snow in a mealy condition, permitting easy removal by plowing. To remove sleet or thin layers of ice or packed snow, the

application of 300 pounds of sodium or calcium chloride per mile of two-lane roadway by means of a truck with a hopper and spreader pipe or any suitable spreading device will generally be effective in melting snow and ice when the temperature is just below freezing.

The use of chlorides straight without abrasives is preferred by many highway maintenance departments because it requires less materials and labor and can be applied faster than when treated abrasives, such as sand or cinders, are used to prevent the slippery condition on ice and snow-covered surfaces. Another advantage of using the chlorides straight on city streets is the labor saved in the spring when the sand or cinders must be cleaned off the streets and out of the gutters and catch basins.

While bare-pavement winter maintenance provides maximum safety, many highway maintenance departments are employing the less costly method of using abrasives on slippery, icy or snowy surfaces. Abrasives treated with calcium or sodium chloride at the rate of 50 to 200 pounds per cubic yard are more effective in becoming embedded and in reducing the skidding hazard than if untreated abrasives are used. The chlorides are also necessary to prevent the abrasives from freezing solid where they are stored in open stockpiles along the road ready for use on hills, curves, intersections and at other danger points. The greatest amount of chloride is needed where the abrasive, such as cinders, contains considerable fine particles which absorb a large amount of moisture. For best results, approximately one-half of the chlorides should be mixed with abrasives when preparing them for the stockpiles and the other half should be mixed with the abrasives when the trucks are loaded just before

spreading them on the icy or packed-snow surfaces.

On portland-cement concrete pavements, it is recommended that sodium or calcium chloride be used as sparingly as possible to prevent pools of brine from forming. It has been found that where these salts have been used too freely, considerable surface pitting and scaling have developed. On important roads, some type of treatment to prevent the slippery, icy or packed-snow condition is highly essential, but where scaling of concrete pavements is likely to be a serious problem, the use of untreated abrasives is recommended.

An important product to prevent scaling has recently attracted considerable attention. It is the development of air-entraining cements which extensive tests have demonstrated will produce concrete pavements highly resistant to the pitting and scaling action of chlorides. Another important observation made recently is that unscaled concrete pavements more than four years old will also be free from the scaling action of these salts.

## Acetylene Generators

A new bulletin on acetylene generators which features the Airco Type P portable generator, incorporating an air-lift water circulating system and enlarged radiation space between the carbide hopper and water level, to eliminate the hot belt and provide cooler double-scrubbed gas, has just been published by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.

The bulletin describes and illustrates the company's complete line of generators, including portable models in 15, 30, and 50-pound sizes with 30, 60, and 100-cubic-foot maximum hourly productive capacity. Stationary models are available in 300 and 500-pound sizes which deliver 300, 600, and 1,000-cubic-foot maximum hourly production.

Copies of the bulletin, which also lists sizes and packaging of National carbide for use in acetylene-gas production, may be obtained by writing to the manufacturer and mentioning CONTRACTORS AND ENGINEERS MONTHLY.

When You're Pouring  
Concrete, Use ...

# SISALKRAFT

OVER THE SLAB  
... TO CURE AND  
PROTECT FROM  
DRIP AND DEBRIS

Waterproof, tear-resistant, scuff-proof SISALKRAFT retards evaporation and protects the concrete from dirt, dripping grout and debris.



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THE JOB FOR  
PROTECTION  
FROM FROST

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For nearly 25 years the unmatched performance of SISALKRAFT has made it the Number One concrete curing and protecting agent. Use it when you're pouring concrete — for buildings, runways and roads.



SINCE  
1890

"SOMEWHERE  
IN ENGLAND"

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Soon still more efficient models will appear on The Buffalo-Springfield line, ready to chalk up still higher performance figures—still lower maintenance costs.



Stand by for announcements.

THE BUFFALO-SPRINGFIELD ROLLER CO.  
SPRINGFIELD, OHIO.



BUFFALO-SPRINGFIELD ROLLERS





British Combine Photo

A jeep railway keeps up a flow of supplies in Burma during the monsoon season. In the past, everything stopped for the monsoons but American initiative has overcome this problem. During the reconstruction of bridges over the Mogaung River, ferries carried the jeeps across on their way to the front.

## New Synthetic Tire For Use on Trucks

Stronger synthetic-rubber truck tires in substantially greater number have been made possible by a new development in rayon tire construction, according to an announcement by the U. S. Rubber Co., Rockefeller Center, New York 20, N. Y. Employing fewer but stronger plies in the tire, the new 2200 denier rayon type has twice the number of filaments twisted together as the 1100 denier, previously the standard in conventional tires. Due to the greater strength of the heavier rayon, it is reported that blow-outs are reduced to a minimum and the stronger individual rayon cords reduce rupture spread, which makes it possible to repair injured tires by recapping, an important aid in tire conservation.

The second advantage, greater production, results from the reduction in the number of operations involved, in materials, and in component parts. A stronger 8-ply tire can be produced now in place of the conventional 10-ply tire formerly made, and a better 10-ply product can replace the standard 12-ply tire.

## One-Point Radial Saw Reduces Operations

The Monarch Uni-Point radial saw featuring one-point cutting, said to reduce angular cross-cutting operations and to eliminate some adjustment motions entirely, thus cutting down the time factor, is described and illustrated in an 8-page catalog recently received from the American Saw Mill Machinery Co., 171 Main St., Hackettstown, N. J., maker of a line of woodworking machinery. Adaptable to hundreds of different wood-working operations, including sanding, boring, shaping and routing, this Monarch Uni-Point is so constructed that the blade height is under constant control, the angle can be changed without stopping the saw, and the gages remain fixed, according to the manufacturer.

Copies of this Form 3713 is obtain-



**The NITE-HAWK Gives You:**  
**LIGHT**—Where you want it—when you want it.  
**POWER**—To operate hand tools—saws, drills, hammers, etc.  
Floodlight and Searchlight Units up to 14 million candlepower.

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**LISTER-BLACKSTONE, Inc.**  
1706 So. 68th Street MILWAUKEE, WIS.

able direct from the manufacturer upon written application and mention of this publication.

## Robins Vice President Visits Rio de Janeiro

Elmer C. Salzman, Vice President in charge of sales for Robins Conveyors Inc., manufacturer of materials-handling

machinery, Passaic, N. J., recently visited Brazil on company business. Mr. Salzman conferred with the officials of Industrias Murray S. A., Robins' Brazilian representative located in Rio de Janeiro, and also inspected the property of the Rio Doces Mine where the company is preparing a system for conveying iron ore.

## Present Military Road Aid to Post-War Travel

A road which was started last spring by the Public Roads Administration, at the request of the War Department, to serve military traffic from Bolling Field, D. C., to Camp Springs Air Base, Md., will quickly convert from war to peacetime usefulness by providing another link in the national capital's metropolitan post-war highway network, according to an item in a recent issue of *Highway Highlights*. The road is 9½ miles long, and is graded for two 24-foot lanes separated by a dividing strip varying in width from 60 to 200 feet.

# SAFE-LINE

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**FOR ROPE SIZES 1/16 TO 3/4**

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## BROWNHOIST BUILDS BETTER BUCKETS

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# Contractors and Engineers Monthly

## YOU'LL HAVE **TOURNAPULLS** TO BEAT ON POSTWAR AIRPORT CONSTRUCTION

Working two 10-hour shifts, Frank Mashuda Company of Milwaukee uses seven big rubber-tired Super C Tournapulls to rush through this 2,275,000 cubic yard contract on the Mansfield, Ohio, Municipal Airport.



### Here's Why:

#### Tournapulls fit long hauls

Airport dirtmoving requires long haul. On Frank Mashuda Company's contract for Mansfield, Ohio, Airport, grading for two 5600 by 150' runways with taxiways, drainage, etc., requires hauls which ran 7200 feet round trip when these pictures were taken. On these long hauls, Mashuda is using 7 15-heaped-yard Tournapulls; with 7 30-heaped-yard, tractor-drawn Carryalls on shorter 1200-foot round trips. See chart below. You can get big yardage on both long and short hauls with Tournapulls.

#### High speed cuts costs

Tournapulls' top speed is 14.9 m.p.h., while crawling tractors do only 7 or less at their best. Because of Tournapulls' large-diameter tires, overall cycles average 2 to 3 times faster than the fastest crawling tractor. This means lower-cost dirt, quicker completion.

#### Save in shallow as well as deep cuts

Revolutionary low costs with Tournapulls are the same whether cuts are a few inches, a few feet, or 100 feet deep. Tournapulls move any yard of top dirt any time you want it, eliminate shovel move-up delays and wasteful re-handling.

#### Accurate, compacted spread

Tournapulls power rugged LeTourneau Carryalls, proved in service by over 2600 units. Positive, load-ejector tailgate, with independent apron control, insures smooth, accurate spreading. Big tires compact the fill, permit prompt paving.

#### Haul on and across runways

Tournapulls' big low-pressure rubber tires (21.00 x 24) carry their loads over paved runways without surface damage. No protective planking or dirt cover is needed. Also note, Tournapull with 15-heaped yard Carryall carries 22,500 lbs. less deadweight than a crawling tractor with same size scraper.

#### Less wearing parts... more time on job

Tournapull is the simplest of all dirtmoving tools. Compared with crawling tractors, the two big rubber-tired wheels take the place of crawlers having more than 500 wearing parts. This means low-cost maintenance, less time out for repairs.

Tournapulls are also simple to operate, more maneuverable than crawling-tractors, turn freely without stresses of dragging tracks sideways in the dirt.

#### Saves by self-haul between jobs

Tournapulls need neither flat-cars nor flatbed trailers to move from job-to-job. They travel over highways, save blocking, loading and switching time, freighting bills.

#### Plan Now for postwar jobs

Investigate the job-proved earthmoving economies offered by Tournapulls on your airports, highways, dams, levees... mine and quarry stripping... sand and gravel operations. Get acquainted with your LeTourneau Distributor. He'll be glad to help you with your postwar equipment plans.

#### ONE-WAY HAUL DISTANCE—CU. YDS. PER 60 MINUTE HOUR\*

Tractor-drawn Scrapers:	400'	600'	800'	1,000'	2,000'	3,000'	4,000'	5,000'	6,000'
30-Yd. Capacity	—	—	175	153	97	71	56	46	39
23-Yd. Capacity	—	187	162	142	89	65	51	—	—
18-Yd. Capacity	196	163	139	122	74	—	—	—	—
15-Yd. Capacity	170	142	121	106	65	—	—	—	—
With 15-Yd. Super C Tournapull you get	300	190	168	156	116	91	76	65	55

\*All units pusher loaded on level.

Manufacturers of TOURNAPULLS, ANGLEDZERS, BULLDOZERS, TILDOZERS, CARRYALL SCRAPERS, POWER CONTROL UNITS, ROOTERS, Tournatrailers, Tournacranes, Tournatrucks, Sheep's Foot Rollers, Tournarope, Tournaweld, Tournalifts.

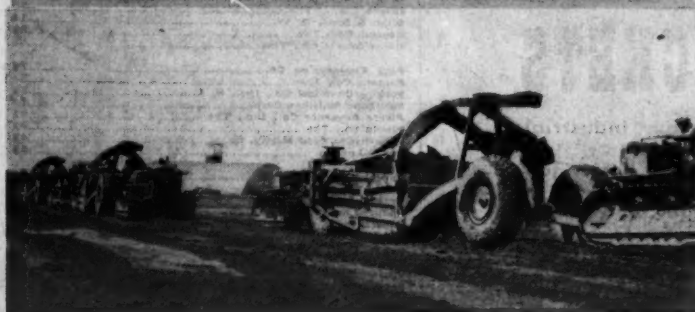
\*Trade Mark Reg. U.S. Pat. Off. C2



Tournapull's ability to spread thin layers accurately is a big advantage in airport work. The independently controlled apron and tailgate ejector dumps the load cleanly and in evenly controlled layers. Well compacted with giant Tournapull tires, the fills hold their grade, need not delay paving.



Here are the same 7 Super C Tournapulls enroute from a previous airport job at Pittsburgh, Pa., to Madison, Wisc. They made the 609 miles in 50 hours' driving time, saved half on freight costs. Sheep's Foot Rollers and job supplies were carried in Scraper bowl for extra economies.



The Mansfield equipment fleet of 28 LeTourneau units includes 150 h.p. Tournapulls, crawler-drawn Carryalls for short haul dirt, Dozers and Rooters. About 90% of the yardage is being moved by LeTourneaus as the job is rushed through.

**LETOURNEAU**  
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

JOB  
PROVED

# TOURNAPULLS

2600 Built  
and Shipped

RUBBER-TIRED POWER FOR FASTER EARTHMOVING



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